SUSTAINABLE FINANCE STUDY GROUP

Background Paper

Developing Sustainable Debt Products for Long-term Institutional Investors

Bank of England; Ministry of the Treasury of Argentina

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Disclaimer: This draft input paper has been prepared by the authors for consideration by the G20 Sustainable Finance Study Group (SFSG) but does not represent the official views or position of the SFSG or any of its members.

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About this report

This input paper has been prepared by the co-Chairs of the SFSG and the Argentine G20 Presidency as a contribution to the G20 Sustainable Finance Study Group (SFSG), but has not been endorsed by it, nor does it represent the official views or position of the SFSG or any of its members.

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Background

Having reviewed the Green Finance Study Group's (GFSG) work program and assessed its progress since its creation, Argentina believes there is a need to continue the work on mobilizing private capital to support environmentally sustainable economic growth and a resilient financial system.

Furthermore, in order to realize a wider array of benefits beyond what environmentally conscious investments bring, additional aspects of sustainable development should be considered as well. It is in this spirit that G20 members adopted the more encompassing term of sustainable finance, and the name of the study group is thus changed to the "Sustainable Finance Study Group" (SFSG). Financial activities that fall under the heading of sustainable finance include sustainable funds, green bonds, green loans, impact investing, sustainable venture capital and the enabling tools and structures that advance sustainable investment products and investments among others.

The past years have shown that sustainable finance can act as an opportunities framework for growth, development and investment promotion. First, the growing involvement by the private sector in areas such as sustainable infrastructure, sustainable innovative businesses and clean technologies has advanced sustainable investments. Second, the GFSG's work has analyzed the challenges and areas of further actions concerning the 'greening' of institutional investors and of the banking system, as well as the development of the green bond market –all of which provide a solid foundation to focus in 2018 on the challenges in deployment. Moreover, work done by the GFSG and the findings presented in the Green Finance Progress Report (UNEP 2017) illustrates how the green financial sector has driven business opportunities by employing new innovative financial products, tools and structures. In fact, an increasing number of private sector-led initiatives in the real economy has acted as catalyst to grow sources of capital for sustainable projects, such as the explosive growth seen in electric vehicles, building energy efficiency products and driving green mortgages.

However, the full deployment of capital in many of these new high growth sustainable sectors still faces barriers, such as common sustainability definitions and taxonomies, information asymmetries, capacity-building and lack of technological deployment. Unleashing this capital presents a strategic opportunity for G20 countries to effectively drive sustainable economic growth and job creation.

Against this backdrop, this input paper aims to provide the SFSG members with insights into the opportunities in the market to help the deployment of sustainable capital by long-term Institutional Investors[1], with a special focus on the development of sustainable debt products.

The world's sustainable debt is largely originated by banks and resides on their balance sheets in the form of loans. For the foreseeable future, the banking sector will remain a key supplier of investment financing, but it likely will not be sufficient to cover the gap for sustainable investments. There will be a funding supply side problem if banks remained

the only provider and/or holder of sustainable finance. Lending to sustainable investments can only accelerate *at pace and scale*, if the debt is paired with, or originated by,[4] investors who are able to hold them *long term* and who understand how to identify and valuate the specific risks and returns associated with sustainable investments. Institutional investors such as insurance companies and pension funds among others can play this role by making money available that will allow long-term sustainable assets to match their long-term liabilities.

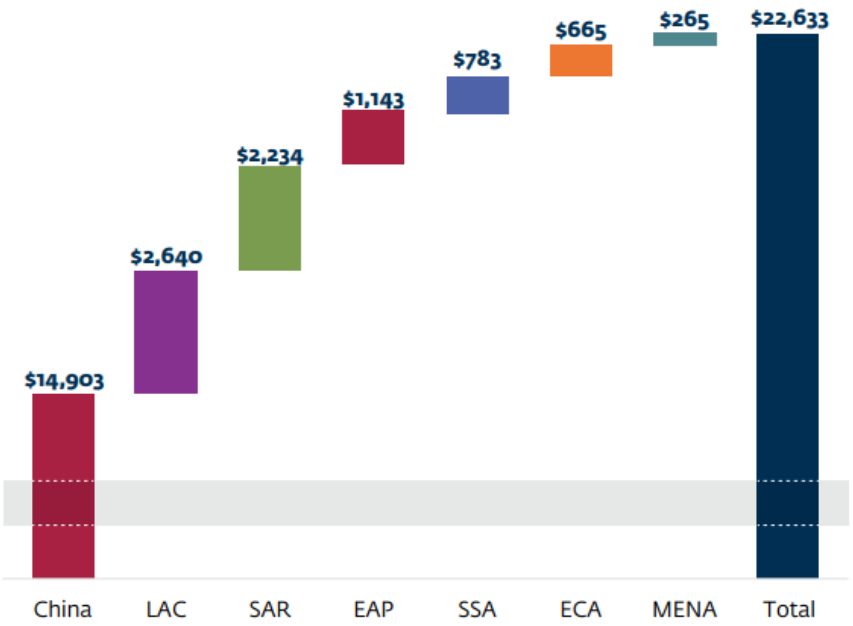
A range of investment products and participants can be adapted for sustainability risk and reward characteristics to finance, refinance or move sustainable loans from banks to institutional investors at the required velocity. Banks correspondingly need to have the capacity and the incentives to develop and issue these products in a format acceptable to institutional investors. By doing so, bank balance sheet capacity can be churned and funding unlocked to meet the accelerating demand for new sustainable investments and support the related economic growth and job opportunities.

The first section of the Paper will provide background on the sustainable loan exposures currently held by banks globally, and why, over time, it will be important to migrate or substitute the exposures or find origination alternatives to provide sufficient funding to meet the supply needs to finance a sustainable economic transition. The second section will examine different types of pathways that sustainable loans might take to become accessible to institutional investors who can provide the funds demanded. This section is accompanies with case studies developed by SFSG Knowledge Partners and SFSG members that look to illustrate examples of commercial best practices of pathways, products and origination alternatives that can be adapted to country specific circumstances to deliver sustainable debt to long-term investors. The third section will assess the challenges to the alternatives advanced to distribute sustainable debt to long term institutional investors. Within this section, potential unintended consequences of certain public and private market products will be considered. Finally, the fourth and fifth section will look at possible options that could be employed to overcome the challenges outlined in section three.

1 ASSESSING THE LANDSCAPE: THE SUPPLY SIDE CHALLENGE

The size of sustainable investments needed globally between now and 2030 is momentous. To meet the global commitment made towards the Sustainable Development Goals (SDGs), it is estimated this would require as much as US$8 trillion annually,[5] or over US$100 trillion between 2016 and 2030. Estimations by the OECD's report "Investing in Climate, Investing in Growth" (2017) forecast that for US$ 6.9 trillion will be required annually in new infrastructure to remain below the climate scenario of 2° Celsius –this is, 10% increase relative to the annual infrastructure investment need of US$6.3 trillion before considering climate issues.[6] Another way to look at the challenge is through the financing needs arising from the Nationally Determined Contributions (NDC). For climate-smart investments in 21 emerging markets alone (including nine G20 members), the International Finance Corporation (IFC) estimates that US$23 trillion is needed (see Chart 1), based on NDC commitments.[8] In fact, it believes this number is likely an underestimation due to data gaps in some sectors not covered by the report (e.g. climate-smart agriculture). It is clear that the amount of sustainable funding the world needs in the mid-term is sizable and needs to be catalyzed quickly.

Chart 1: Climate-Smart Investment Potential 2016-2030 (US$ billion)



Note: EAP = East Asia Pacific; ECA = Europe and Central Asia; LAC = Latin America Caribbean; MENA = Middle East and North Africa; SA = South Asia; SSA = Sub-Saharan Africa.

Source: "Climate Investment Opportunities in Emerging Markets" Report, IFC, November 2016[9].

The range of sustainable investments to support the transformation of the economy into one that is environmentally and socially sustainable, and that remains below the 2° Celsius is broad. The investments comprise all industry sectors, themes, infrastructure and non-

infrastructure projects as well as technological and non-technological innovations across all regions.

Based on the sets of sectors presented in the Input Paper "Towards a sustainable infrastructure securitisation market: The role of collateralised loan obligations (CLO)" (2018), below is an overview of the different sectors of relevance for the discussion on creating sustainable assets for the capital markets:[10]

Under the 'sustainable energy' infrastructure realm: power generation from solar, wind, small hydro[11], geothermal, marine, biomass and waste-to-energy, biofuels, carbon capture and sequestration and 'energy smart technologies' (such as smart grids, inter-connectors, energy efficiency, storage and electric vehicles).

Understanding sustainable energy infrastructure as a subset of 'sustainable infrastructure', then the following areas are to be considered as well:

- 'Low-carbon and climate-resilient' infrastructure projects that either mitigate greenhouse gas emissions or support adaptation to climate change or both; and
- Other investments with environmental benefits, including sustainable agriculture, floodplain levees and coastal protection, waste management infrastructure and 'green' water infrastructure. Green water infrastructure may include wastewater treatment and infrastructure that requires less concrete, e.g. through rainwater harvesting, source control of surface water (such as sustainable urban drainage systems), green roofs, and local processing of grey or black water.

It is worth noting as well that we are witnessing a process of redefinition of what constitutes infrastructure, with decentralization as a core aspect and the idea of systems of infrastructure projects emerging. As the Report Financing Climate Futures puts it, "the concept of electricity access being solely grid based is changing to one of a 'lego' design, where varied electricity options are helping to achieve full access."[12] There are various innovations driving this, such as mobile payment platforms supporting "pay-as-you-go" business models.

Commitments and actions towards sustainable development, and specifically climate change through the NDC, are driving the pace of sustainable finance as the need for significantly more financing for the economic sustainable transformation is elluciadated.[13] As a result, a diversification of the market place is taking place to provide with channels and products to bridge the finance gap. In fact, as the OECD Background Paper to the G20 SFSG (2018) informs, various approaches are being used to encourage institutional investment to tap into the financial potential of sustainable infrastructure projects.[14] Among the examples presented are: a refinancing of a portfolio of 7 projects loans by the National Australian Bank facilitated by an anchor investment from the Clean Energy Finance Corporation (CEFC); securitisation of consumer receivables from residential energy efficiency projects in Australia also facilitated by the CEFC; a credit enhancement instrument deployed by the Asian Development Bank and the India Infrastructure Finance Company Ltd. to refinance project loans and recycle capital for new asset financing. One could imagine Artificial Inteligence (AI) and big data being able to strip out credit card

receivables for sustainable products and services to create sustainable credit card Asset-Backed Security (ABS).

1.1 Banks balance sheet capacity for sustainable investments

The assets and companies that make up the global real economy are predominately financed by bank loans, bonds and equity. Bank loans currently provide a disproportional amount of the financing for sustainable assets and investments such as energy savings and storage, and water and waste treatment.

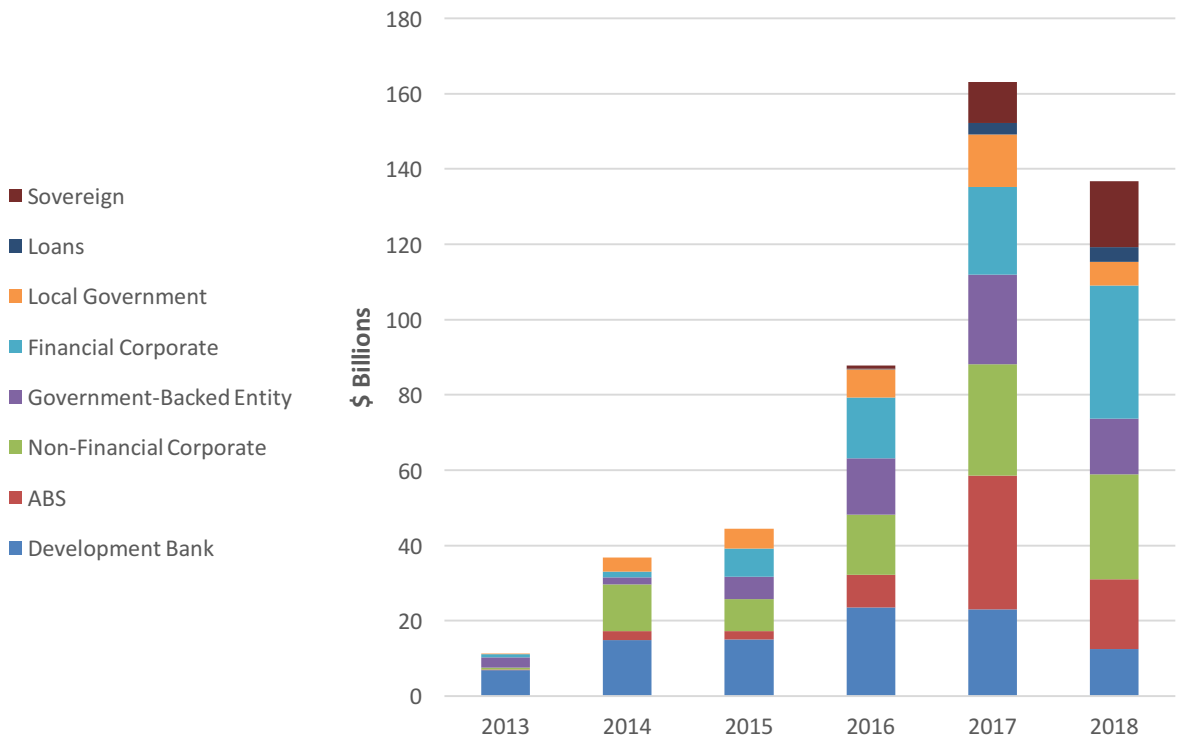
Within the energy sector, the GFSG's 2016 Synthesis Report noted that banks, on a global basis, are the primary source of funding for renewable energy, involving debt transactions reaching US$104 billion in 2015.[15] Then, over 100 banks and leasing companies formed the Alliance of Energy Efficiency Financing institutions, with a new focus on funding residential and industrial energy efficiency. These efforts were becoming strategic for some banks already in 2016, trend that has continued. Within general infrastructure projects, based on data from IJ Global (2017), bank loans appear as the main source of infrastructure financing.[16] This is particularly relevant given that a good part of the investment projects needed to cope with the SDGs and the NDCs involve the development or retrofitting of infrastructure. Estimates of the Intergovernmental Group of 24 (G24) and the Global Green Growth Institute (GGGI) show that in the case of new infrastructure in emerging and developing economies, "around 20% is financed by loans (mostly development banks and a share of the private investments); 56% is financed by budget, i.e., mainly by grants, and 24% is financed by equity and quasi-equity instruments coming from private investors."[17]

Notwithstanding banks critical role in financing a sustainable economy, their balance sheets alone do not appear to be enough to meet the challenge. As the aforementioned OECD Background Paper to the G20 SFSG (2018) states, the transformation of the economy to one that remains below 2° Celsius "is unlikely to be solely financed on corporate balance sheets and by debt financing (e.g. bank loans, bonds) alone."[18] The paper considers the unintended consequences of Basel III financial regulations, making it harder than before for banks to finance long-term infrastructure projects, and more specifically, Basel III may have unintentionally constrained banks in providing long-tenor debt financing to capital-intensive renewable power infrastructure projects.

Achieving a sustainable transformation of the economy will demand an active and effective role from the private sector. While public finance will certainly continue to play a critical role, especially through facilitation, leveraging and guiding investments, investment on the scale needed will require large-scale private sector engagement.[19] Furthermore, given the marked growth of private sector sustainable financing through the green bond market, via the participation of financial corporates, but especially by non-financial corporates, bonds may be the pathway for private sector sustainable finance. Yet, as highlighted by Michael Wilkins, Head of Sustainable Finance S&P Global Ratings Infrastructure Hub, issuers are "exploring new ways of making green investments – through green loans, green equity

portfolios, and green securitizations (financial products whose underlying collateral or assets are green or which reinvest their proceeds in green technologies)" and consider there is private issuers' readiness to explore such new business opportunities.[20]

Chart 2. The labelled green bond is growing rapidly



Source: CBI Highlight Dec 2017[21]

2 THE OPPORTUNITIES

As shown, private capital will play a critical role in driving sustainable development and growth. Work done by the GFSG during 2016 and 2017 has shown the green financial sector has driven business opportunities by employing new innovative financial products, tools and structures. Furthermore, an increasing number of private sector-led initiatives have materialized in growing sources of capital for sustainable projects and there are signs of appetite to diversify across asset classes in their exposure to sustainable investments.

The debt capital markets are the world's largest and deepest pool of capital, valued at well over US$ 100 trillion in outstanding securities. This section provides a brief overview of some opportunities arising to set the stage for the creation of sustainable assets attractive to the capital markets.

2.1 Growing Demand And Interest by institutional investors

Most institutional investors possess structurally long-term balance sheets that can naturally hold long-term sustainable debt related or linked to sustainable assets.[1] Among institutional investors are pension funds, insurance companies, investment funds, sovereign wealth funds, public pension reserve funds, foundations, endowments and other forms of pooled institutional savings.

In 2016, the G20 GFSG set out to explore challenges and options to scaling green finance. An initial program of five topics has covered three sectoral issues namely banking, the bond market, and institutional investors, as well as two cross-cutting topics, risk analysis and measuring progress in green finance. The reflections and findings from the work of the GFSG in 2016 laid already leads on emerging opportunities.

The GFSG work on greening institutional investment looked absorbed the advances in responsible investment. The latter refers to an "approach to investment that explicitly acknowledges the relevance to the investor of environmental, social and governance (ESG) factors, and the long-term health and stability of the market as a whole."[23] Globally, support for the Principles for Responsible Investment has grown consistently, from under 100 signatories representing US$6.5 trillion in 2006 to almost 2,200 signatories representing US$81.7 trillion in 2018. Although the largest number of signatories are in the US (361) and Europe (1,188), a significant number are in emerging markets including South America (63), Asia (157) and Middle East and Africa (82).

Box 1 presents the key drivers identified by the PRI and UNEP FI (2016) for the growth of responsible investment among institutional investors are.[24]

Asset owners sit squarely at the top of the investment chain given they are the ultimate providers of capital. Thus, the growth of their commitments and investment preferences

[1] Although some banks can hold long term debt (especially state owned or guaranteed), many rely upon on demand deposits and short/mid-term corporate financing to fund their balance sheets. Hence, there is a general maturity mismatch between many sustainable investments and many banks.

towards sustainable finance are paramount. Within the G20, some of the largest asset owners and investment managers have committed to responsible investment.[25]

Table 1: Asset owners signatory of the PRI

Top 10 Asset Owners by AUM		
SIGNATORY NAME	**AUM ($BN)**	**SIGNATURE DATE**
Allianz SE	2506.3558	13/10/2011
AXA Group	1707.3688	29/11/2012
GPIF	1285.1758	25/09/2015
Norwegian Government Pension Fund Global (Norwegian Ministry of Finance and Norges Bank Investment Management)	1020.7494	02/07/2006
Japan Post Insurance Co., Ltd.	712.5189	27/10/2017
Generali Group	629.5158	15/06/2011
Nippon Life Insurance Company	612.3783	16/03/2017
CDC - Caisse des dépôts et consignations	591.3797	27/04/2006
Korea National Pension Service (NPS)	567.5634	25/06/2009
Sun Life Assurance Company of Canada	559.6375	18/12/2014

Top 10 New Asset Owners (by AUM) in Past Year (22nd Nov 2017 – 21st Nov 2018)		
SIGNATORY NAME	**AUM ($BN)**	**SIGNATURE DATE**
Just Group Plc	31.4	14/09/2018
Caisse de retraite du groupe Pictet	2.1	31/07/2018
Presbyterian Church U.S.A. Foundation	1.129	23/03/2018
Nysnø Climate Investments	0.4	23/10/2018
Fonds de placement du Barreau du Quebec	0.32	22/01/2018
Diepensteyn NV	0.3	14/06/2018
University of New Hampshire Foundation	0.224	31/07/2018
La Mútua dels Enginyers	0.171	01/03/2018
Mount Allison University	0.134	14/05/2018
ANESVAD FOUNDATION	0.061	11/05/2018

BOX 1. Drivers of Responsible Investment among institutional investors:

Long-term value. There is growing belief across the G20 that consideration of ESG factors is important to long-term value for pension fund recipients.

Risk management. This is a driving factor for large asset owners where green risk factors are included in investment beliefs as well as in mainstream investment management.

Client demand. This is growing across markets, including emerging markets. 52% of YouGov survey respondents in Brazil say they would like information on how companies in their funds deal with ESG issues such as climate change, with civil society one driver of beneficiary interest.

Strategic policy signals. Investors welcome The Paris Agreement and the Sustainable Development Goals4 as signals of the policy trajectory.

Regulatory action. Some of G20 members regulatory actions have been the French Energy Transition Law and SRI fund labelling, Stewardship codes, and the advance in the implementation of the EU HLEG recommendations. Several countries within the G20 have pension fund regulation covering ESG disclosure and stock exchanges with a sustainability listing rule.

Asset owners are mostly inclined towards directing their investment allocations to the large, deep and liquid investment found in fixed income and public equities. However, some have meaningful investments in private equity, infrastructure and real assets.[26] Notwithstanding, recent research in 2017 shows institutional investors "are also actively innovating new solutions to create more aligned, partnership based vehicles for long-term investment that provide for more direct access to infrastructure projects (as well as other types of long-term investments such as private equity, venture capital, real estate, timber and agriculture)."[27]

In the sustainable infrastructure space, no unified and systematic database exists for tracking stocks and flows of institutional investments. However, existing data sources show a picture of a small but growing market.[28] Furthermore, given the prevailing low interest rate environment and weak economic growth prospects in many OECD countries, institutional investors are increasingly looking for asset classes which can deliver long-tennored, low-correlation, steady, preferably inflation-linked, income streams.[29]

One way to provide institutional investors access to sustainable infrastructure cash flows is through investments in asset management companies that manage infrastructure assets. Research by Morgan Stanley on sustainable signals from asset managers, conclude that "the field of sustainable investing is expanding across asset management firms" and that sustainable investing is identified as a business-building strategy by 68% of all survey respondents to Morgan Stanley's survey.[30] The report also cited "an influx of new players and intermediaries, with increasing coverage in the financial media of both sustainable investing and divestment campaigns as drivers."[31] The survey backing the findings reveal a surge in the asset management industry's engagement in sustainable investing to meet client demand. Furthermore, more than half of survey respondents from firms that don't currently practice sustainable investing, believe its adoption will increase in the next five years.[32]

Concerning challenges, experiences and options to mainstream sustainability among institutional investors, findings from the the PRI and UNEP FI paper (2016) found the availability of investment opportunities and pipeline as one of the key supply-side

challenges to scaling sustainable finance by institutional investors.[2] Specifically, investors saw as a barrier "the small size of certain green investment opportunities, which are difficult to include within regular asset allocation decisions."[33] Key findings in this respect were:

- The insufficient development of regular equity and debt capital market options for institutional investors looking to make green investments
- Lower willingness of many mainstream asset owners to invest in private equity and venture capital, where financial support is needed for new environmental technologies[3]
- Lower willingness of many mainstream asset owners towards infrastructure allocation due to liquidity constraints and currency risks
- Project driven investments are perceived as requiring specialist knowledge
- Lack of aggregation of small-sized green projects prevents accessing these
- Investors do make significant investments in emerging markets, but need to know that potential risks associated with these are mitigated, and they may be risk averse
- Lack of performance track record by certain green funds, demanding hence, more time for due diligence
- Demand for green bonds outstrips supply
- Early adopters of green investment do not capture the wider benefits of growing a new sector

Taking into account the growth in commitment and appetite from institutional investors towards ESG, their long-term balance sheets, and the challenge they face to find suitable sustainable assets, the impact of existing efforts will be maximized if the appropriate sustainable assets that meet institutional investor's preferences are available.

2.2 Growth of the sustainable bonds market

In 2016, the GFSG also set out to explore challenges, experiences and options to green the bond market. As presented in the Green Finance Synthesis Report 2016, the green bond market:

> "…emerged in 2007-08 with the first few issuances by MDBs. From 2007-2012, the market was mainly characterized by the issuance of green bonds by supranational organizations such as the World Bank, IFC and European Investment Bank (EIB), along with a few governmental entities and municipalities and national development banks."34

[2] Two other challenges on the supply-side were inadequate data and inadequate risk analysis. These two were analysed and discussed by the GFSG during 2017 under the German G20 presidency, with findings presented in the Green Finance Synthesis Report 2017.

[3] This issue was one of the three working topics covered by the SFSG in 2018 under Argentina's G20 presidency.

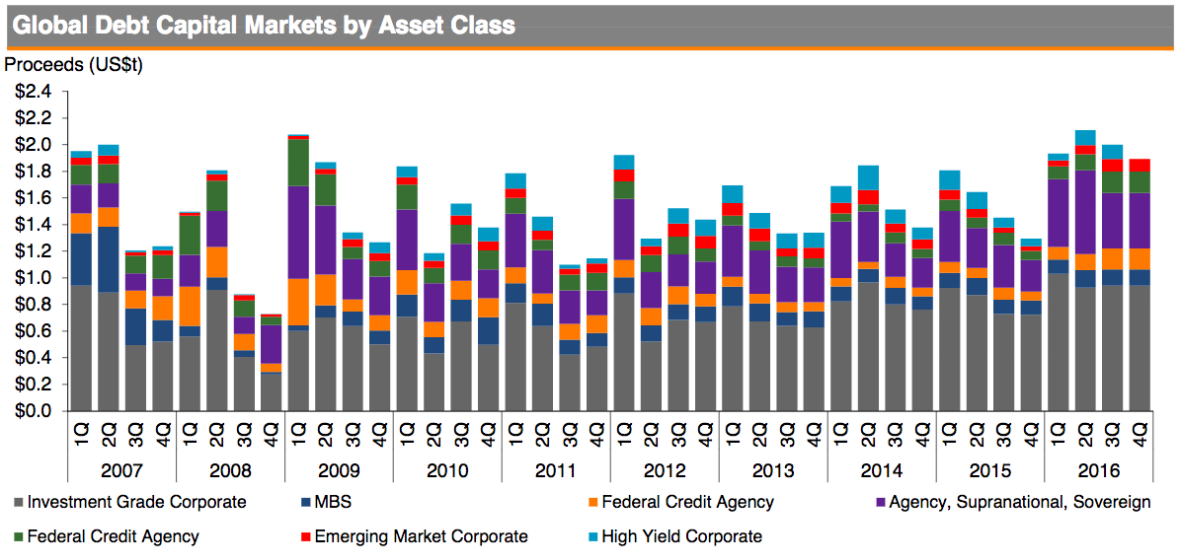
Already in 2016, there was growing market appetite for green bonds and an increasing diversification of issuers and investors participating in this market. Private sector issuers, including corporates and banks, started to grow in 2013.

Since 2014, investors began to look to the International Capital Markets Association's (ICMA) Green Bond Principles for a voluntary framework to guide green bond classification.

Annual issuance of labelled "green bonds" rose from just US$3 billion in 2012 to US$161 billion in 2017 (not cumulative), and 2018 issuance is almost US$142 billion as of late November. Over these years, labelled green bonds issuance has occurred in seventeen G20 markets. In the first quarter of 2016, total issuance rose further to about US$17 billion, up 66% year-on-year.[35]

The green bond market is clearly large and growing fast, however, it still remains a small fraction of the US$100 trillion public debt market (US$155.5 billion)[36]. Furthermore, issuances are dominated by investment grade corporate and sovereign borrowers as can be seen in Chart 3. Hence, a movement of sustainable loans from bank balance sheets to those of institutional investors either through private sales, the debt capital markets or origination will require development of alternatives to finance sustainable debt *at scale*.

Chart 3: Debt Capital Markets by Asset Class 2007-2016 (US$ Trillion)



Source: Bloomberg

2.3 Growth of green loans

In 2016, the GFSG also set out to explore challenges, experiences and options to green the banking system. The Green Finance Synthesis Report 2016 found that “across the G20, green banking practices are at different stages of development” and that “the response of banks to environmental and social challenges is profoundly influenced by the size and capacity of banks, as well as the market and regulatory context.”[37] One benefit

identified by the GFSG for banks was by incorporating environmental factors into their decision-making, banks can more effectively manage the risks associated with lending to polluting sectors and could help improve the resilience of the financial system. A second benefit presented was that by providing green credit to responsible borrowers, banks can contribute to and benefit from environmentally sound projects, in turn supporting sustainable growth.

Key finding on the challenges were:

- **Limited application of sustainable banking principles:** Despite the number of voluntary initiatives on sustainable banking, their application remains limited.
- **Maturity mismatch for green lending:** Some banks are constrained in their ability or interest in extending long-term loans due to relatively short maturity on the liability side of their balance sheets and the need to avoid excessive maturity transformation. Where capital markets are less developed and/or banks are not effectively tapping the bond market, such a maturity mismatch could be a major constraint on the financing of long-term green projects.
- **Information asymmetries created by a lack of data:** In many countries, the lack of borrowers' environmental information (e.g., borrowers' emissions data and environmental technologies they employ) limits banks' ability to assess the materiality of environmental risks involved in project and corporate finance.
- **Lack of analytical and implementation capacity:** The inability of the banking sector to fully assess the risks associated with a highly complex and evolving risk is a major barrier.

Efforts towards sustainable banking practices have grown in spite of not counting with a sustainable/green loan benchmark comparable to that in the green bonds market. The total volume of global loans in 2017 was US$ 4.3 trillion[4] and significant prospects have emerged recently for sustainability-aligned lending.[38]

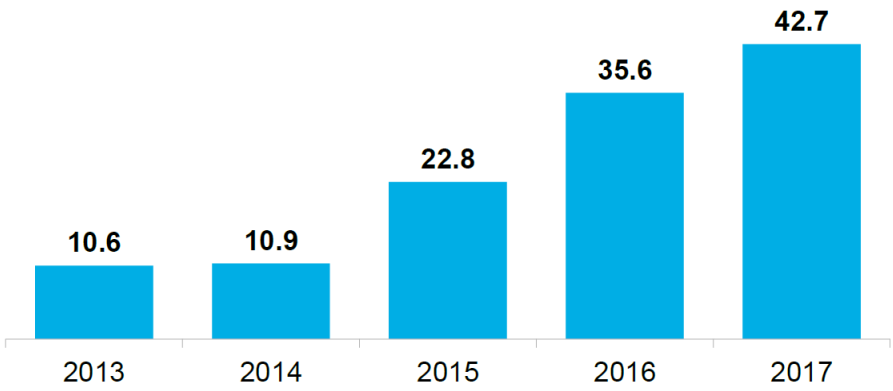
In March 2018, the Loan Market Association (LMA), together with the Asia-Pacific Loan Market Association (APLMA) launched the Green Loan Principles (GLPs), creating an opportunity for a step change in scaling sustainable finance in the banking system. The GLPs aim to "create a high-level framework of market standards and guidelines, providing a consistent methodology for use across the green loan market, whilst allowing the loan product to retain its flexibility, and preserving the integrity of the green loan market while it develops."[39] In other words, they facilitate the labelling of environmentally sustainable loans.

The Green Loan Principles have adopted the architecture of the Green Bond Principles, which have carried a similar green governance task for the bond community since their development in 2014. The convergence of green principles in bonds and loans represents a significant step in the development of a common framework for green debt and signifying

[4] Global Syndicated Loans League Tables- Full Year 2017, Bloomberg Professional Services

an effort to converge green governance across the debt universe. Both sets of principles cover four areas: the use of proceeds, the internal framework to select and evaluate projects, the management of green proceeds, and the reporting of both proceed allocation and impact of projects funded.[40]

Chart 4. Tagged Green Loan Issuance prior to the establishment of the Green Loan Principles (US$ billion)



Source: Bloomberg

It is encouraging to see that the sustainable bank lending and securitization have picked to approximately US$36 billion of issuance in 2017.[41] It remains concentrated geographically so far, but with the potential to grow in other places, including emerging and developing economies. Plus, opportunity to ramp up green securitization is staggering given the demand for sustainable loan debt to finance sustainable infrastructure, electric cars and efficient buildings over the next fifteen years to exceed US$100 trillion.

3 PATHWAYS AND PRODUCTS TO MOVE SUSTAINABLE LOANS

Although the amount of sustainable finance needed in the mid-term to finance the sustainable transition is staggering, the funds available from long-term institutional investors is sizable and most likely enough to meet the challenge.[42] That said, the sustainable debt needs to be in a format that meets the preferences of these investors, whether it be loans, bonds or access to cash flows via third parties. While the scale of investment needs is relatively well known, a clearer understanding of how investment needs can feasibly be financed from private sources of debt and equity capital is still emergent.

This section focuses on the creation of sustainable financial assets for the debt capital markets. As the previous chapter show, and given the advances in the discussion by the GFSG in 2016 and 2017, this section will focus on the challenge of the availability of of sustainable investment opportunities and pipeline to facilitate the deployment of institutional investors' capital. Furthermore, given the opportunities emerging by the growth in sustainable lending, the bond market, the demand of products by varied institutional

investors, and the potential limited capacity of banks' balance sheets to finance the sustainable transformation of the economy, this document will look to shed light on cases, challenges and options related to the debt capital markets.

For the purpose of this section, sustainable assets, sustainable loans, sustainable debt and sustainable bonds refer to specific financial products or debt linked to assets or investments that target environmental and social sustainability; however, the more general consideration of financial sustainability is also contemplated.

The timely and efficient shift of these assets to the capital markets from banks will free up limited banks' balance sheets capacity for recycling capital back into early-stage sustainable projects financing where banks are best suited to handle the risk of greenfield projects.[44] That said, it is acknowledged some banks may have legitimate reasons for retaining sustainable loans on their balance sheet. However, for the many banks that will want or need to move sustainable loans into the debt capital markets, it becomes important[45] to build pathways to institutional investors.

A range of debt capital market products can act as pathways to finance or refinance sustainable loans for institutional investors. Two pathways, public and private, can be used to provide institutional investors with sustainable loans. For the purpose of this paper, a public pathway will be defined as the sale of a sustainable loan into an aggregated pool of loans or the cash flows thereof through a public security (such as a bond) via the debt capital markets. In this sense, banks could analyze the benefits of re-purposing[46] capital market products that aggregate and transform sustainable loans into an asset-backed bond format preferred by institutional investors and in a manner consistent with financial stability and existing regulations. By aggregating and selling sustainable loans into the DCMs, banks and corporates will be able to refresh their balance sheets and apply the proceeds to underwrite new sustainable investments.[47] This process will serve to enhance both the volume and velocity of sustainable capital formation. A private pathway shall be defined as a private sale or origination of a sustainable loan. Furthermore, a private pathway can be an alternative source of gaining access to sustainable assets via direct institutional investor underwriting or investing in funds that manage sustainable loans.

For avoidance of doubt, both private and public pathways fall within the private sector (though public-sector tools such as guarantees or subordinate debt could be part of the structure of a sustainable loan product).

These two pathways, and the products and processes that deliver financing are powerful and offer great opportunities to enhance global capital for sustainable loans. The expanded liquidity provided by institutional investors will allow banks to free up space on their balance sheets to underwrite new sustainable loans.

3.1 Public Pathways to Move Sustainable Loans

The debt capital markets (DCMs) offer an efficient and highly developed pathway to sell and trade individual sustainable bonds or packages of sustainable loans in the form of asset (loans or leases) based bonds.

The DCMs in some jurisdictions are exceptionally deep and liquid and offer long-term investors a wide variety of sustainable debt products. In large global financial centers the DCMs can move sustainable bank loan debt into the hands of institutional investors at both scale and pace as these markets are well acquainted with asset based bonds. These markets have the potential to unlock and meaningfully increase financing for important sustainable projects such as clean tech devices, clean energy and new battery technology. Although the DCMs are most often associated with large financial centers, great progress has been made in the development of local currency bond markets (LCBMs) in emerging markets.

Table 2: Emerging Markets Debt Overview 2010-2015

	2010	2011	2012	2013	2014	2015
Total Debt	11.8	12.7	14.0	14.6	14.9	17.2
Local Currency	10.5	11.2	12.2	12.6	12.8	15.0
International Market	1.3	1.5	1.8	2.0	2.1	2.2
Local as Share of Total (%)	89.0	88.2	87.1	86.3	85.9	87.2
Local as Share of GDP (%)	46.0	42.0	44.0	42.0	42.0	50.0
General Government	6.2	6.5	7.1	7.4	7.5	7.8
Non-government	5.6	6.1	6.8	7.1	7.4	9.4
Government as Share of Total (%)	52.5	51.6	51.1	51.0	50.3	45.3
Government as Share of GDP (%)	27.2	24.4	25.6	24.7	24.6	26.0
Non-government as Share of GDP (%)	24.5	22.9	24.5	23.7	24.3	31.3
Local Currency Debt by Type of Issuer	10.5	11.2	12.2	12.5	12.8	15.0
General Government	5.6	5.9	6.4	6.6	6.7	7.0
Non-government	4.9	5.3	5.8	5.9	6.1	8.0
Government as Share of Total (%)	53.3	52.7	52.5	52.8	52.3	46.7
International Debt by Type of Issuer	1.3	1.4	1.7	2.0	2.1	2.2
General Government	0.6	0.6	0.7	0.8	0.8	0.8
Non-government	0.7	0.8	1.0	1.2	1.3	1.4
Government as Share of Total (%)	46.2	42.9	41.2	40.0	38.1	36.4
Local Non-government Debt by Region (%)	100	100	100	100	100	100
Asia Pacific	73	73	73	74	76	83
Latin America and Caribbean	20	20	19	19	18	12
Emerging Europe	4	4	4	4	3	3
Africa and Middle East	3	3	4	3	3	2
Local General Government Debt by Region (%)	100	100	100	100	100	100
Asia Pacific	49	50	51	53	57	61
Latin America and Caribbean	33	33	31	30	28	25
Emerging Europe	11	11	11	10	9	8
Africa and Middle East	7	7	7	7	6	6

Note: Data based on J.P. Morgan, IMF staff calculations, BIS.
Source: IMF Staff Note, 2016.

The development of LCBMs is beginning to gain momentum in emerging economies and is opening up countries to funding from a variety of local sources. In 2011, during the Cannes Summit, the G20 endorsed an action plan to support the development of bonds markets in emerging economies. The result of this work resulted in a diagnostic framework for LCBMs produced by the the International Monetary Fund (IMF), the World Bank, the European Bank for Reconstruction and Development (EBRD) and the Organisation for Economic Co-operation and Development (OECD).[49] In Table 2 above, it is clear that local currency

solutions to sustainable debt in emerging markets (EMs) is essential, with over 85% of all debt denominated in local currencies.

In a 2016 IMF Staff Paper[50] that followed up on the original Diagnostic Framework, the IMF pointed out that "several [emerging markets] are looking to channel investments from the pensions and insurance industries to longer-term government and privates sector instruments." The Report goes on to state there is "room to grow in terms of maturity and diversity of instruments, especially privates sector instruments." Furthermore, despite cross-country differences, BIS statistics show both, domestic and international, debt securities issuance has grown in emerging economies; and in many of them, international debt issuance has grown faster than crossborder bank lending post-crisis.[51]

The opportunities being created in the EMs with LCBMs could be meaningful to advance sustainable debt. These markets could become important transmission mechanisms to move local sustainable loans into the hands of local long-term investors. However, some barriers to sustainable LCBMs are specific to sustainable debt. These barriers will be examined further in Chapter 3.

Bonds provide the advantage of already being a well-established asset class in the investment portfolios of mainstream institutional investors and have significant potential to transform the economy into one that is more environmentally and socially sustainable. Plus, bonds have long been the asset class favored by pension funds and insurance companies.

OECD institutional investors manage up to US$84 trillion[55] in assets and asset owners – and OECD-based asset owners alone manage around US$54 trillion.[56] Bonds with longer maturities are potentially a good fit with institutional investors' long-term liabilities, allowing for asset-liability matching.

There are many types of bonds and all variations can be structured to target projects looking to generate environmental and social sustainability outcomes. From a sustainability perspective, bonds can target environmental, social or both aspects of sustainability simultaneously. The available principles and guidelines[57] created and used by the market have responded to this reality, thus we count with the Green Bond Principles (GBP), Social Bond Principles (SBP) and Sustainability Bond Guidelines (SBG), where:

- Green bonds enable capital-raising and investment for new and existing projects with environmental benefits.

- Social bonds are bonds that raise funds and direct the 'use of proceeds' towards new and existing projects with positive social outcomes.

- Sustainability bonds look for the application of the 'use of proceeds' bond concept to bonds financing both green and social projects.

It is worth noting, in line with the GBP, the Climate Bonds Standard was launched by the Climate Bond Initiative (CBI) to set out clear criteria to verify certain green credentials of a

bond or other debt instrument. The scope covers projects or assets that directly contribute to: (a) developing low carbon industries, technologies and practices that mitigate greenhouse gas (GHG) emissions and (b) essential adaptation to the consequences of climate change. The Climate Bonds Standard consists of a Certification process, pre-issuance requirements, post-issuance requirements and a suite of sector-specific eligibility & guidance documents, and fully integrate the GBP.[58]

From the bond structuring perspective, there are currently four types of bonds that could cater environmentally and socially sustainable projects:

- Standard Use of Proceeds Bond: A standard recourse-to-the-issuer debt obligation aligned with the GBP/SBP/SBG.

- Revenue Bond: A non-recourse-to-the-issuer debt obligation aligned with the GBP/SBP/SBG in which the credit exposure in the bond is to the pledged cash flows of the revenue streams, fees, taxes, etc. and whose use of proceeds goes to related or unrelated project(s).

- Project Bond: A project bond for a single or multiple project(s) for which the investor has direct exposure to the risk of the project(s) with or without potential recourse to the issuer and that is aligned with the GBP/SBP/SBG.

- Securitized Bond: A bond collateralized by one or more specific project(s) including but not limited to covered bonds, ABS, MBS and other structures and aligned with the GBP/SBP/SBG. The first source of repayment is generally the cash flows of the assets.

In short, there are multiple possible combinations of bond structuring and sustainability targets that allow catering to diverse financial needs from sustainable projects. Table 3 presents a sample of different types of bonds reflecting such variety.[59] The range of selected bonds below are based on the OECD's Progress Update (2018) that extends and continues the data collection and analysis from the 2016 OECD Progress Report on Approaches to Mobilising Institutional Investment in Green infrastructure.

Table 3. Selected examples of green bonds and green securitisation

go	YEAR	COUNTRY	BOND TYPE	STANDARD	CATEGORY	SECTOR	INVESTORS	PUBLIC INTERVENTION		
								ACTOR	RISK MITIGANT	TRANSACTION ENABLER
National Australia Bank green residential mortgage-backed security	2018	Australia	Green Residential Mortgage Backed Security	Climate Bond Standard (CBI)	Energy Efficiency	Low-carbon buildings	Clean Energy Finance Corporation (CEFC), undisclosed institutional investors	CEFC	Cornerstone Stake	
KommunKredit green bond	2018	Denmark	Green Bond	Green Bond Principles (ICMA)	Multiple	Multisector	APG Asset Management, ACTIAM N.V., undisclosed investors	KommunKredit		Warehousing and pooling
Kommuninvest green bond	2018	Sweden	Green Bond	Green Bond Principles (ICMA)	Multiple	Multisector	Affirmative Investment Manager, AI Pension, AP7, Blackrock, Danske Capital, the Folksam Group, Länsförsäkringar Bank, Nordea Asset Managment, PostFinance AG, Raiffeisen KAG, SEB Asset Managment, Swedbank Robur, Öhman Asset Management	Kommuninvest		Warehousing and pooling
KommunKredit green bond	2018	Denmark	Green Bond	Green Bond Principles (ICMA)	Multiple	Multisector	APG Asset Management, ACTIAM N.V., undisclosed investors	KommunKredit		Warehousing and pooling

Commonwealth Bank of Australia climate bond	2017	Australia	Climate bond	Climate Bond Standard (CBI)	Energy Efficiency, low carbon mobility		Clean Energy Finance Corporation (CEFC), undisclosed institutional investors	CEFC	Cornerstone Stake	
FlexiGroup climate bond	2017	Australia	Green Asset Backed Security	Climate Bond Standard (CBI)	Renewable Energy	Solar	Clean Energy Finance Corporation (CEFC), undisclosed institutional investors	CEFC	Cornerstone Stake	
Investa Office Fund green bond	2017	Australia	Green bond	Climate Bond Standard (CBI)	Energy efficiency	Low-carbon buildings	Clean Energy Finance Corporation (CEFC), undisclosed institutional investors	CEFC	Cornerstone Stake	
Investa Commercial Prooperty Fund green bond	2017	Australia	Green bond	Climate Bond Standard (CBI)	Energy efficiency	Low-carbon buildings	Clean Energy Finance Corporation (CEFC), undisclosed institutional investors	CEFC	Cornerstone Stake	
Kommuninvest green bond	2017	Sweden	Green bond	Green Bond Principles (ICMA)	Multiple	Multisector	Affirmative IM Partners, Amundi, AP Fonden, CalSTRS, Praxis Impact Bond Fund and SEB Investment Management	Kommuninvest		Warehousing and pooling
Westpac climate bond	2016	Australia	Climate bond	Climate Bond Standard (CBI)	Energy efficiency	Low-carbon buildings	Clean Energy Finance Corporation (CEFC), undisclosed investors	CEFC	Cornerstone Stake	
FlexiGroup climate bond	2016	Australia	Green Asset Backed Security	Climate Bond Standard (CBI)	Renewable Energy	Solar	Clean Energy Finance Corporation (CEFC), undisclosed investors	CEFC	Cornerstone Stake	
Monash University climate bond	2016	Australia	Climate bond	Climate Bond Standard	Multiple	Multisector	Clean Energy Finance Corporation (CEFC), undisclosed	CEFC	Cornerstone Stake	

				(CBI)			investors			
Kommuninvest green bond	2016	Sweden	Green bond	Green Bond Principles (ICMA)	Multiple	Multisector	Alecta, AP3, AP7, Danske Capital, Folksam Group, Nordea Asset Management, KfW, SBAB, SPP Storebrand, Öhman Asset Management	Kommuninvest		Warehousing and pooling
Kommuninvest green bond	2016	Sweden	Green bond	Green Bond Principles (ICMA)	Multiple	Multisector	AP3, AP4, CalSTRS, Erste Asset Management, Everence Financial, NIB, Raiffesien KAG, SBAB Trasury, SEB Investment Management, United Nations Joint Staff Pension Fund	Kommuninvest		Warehousing and pooling
Renew Financial and Citi energy efficient loan asset backed security	2015	United States	Green Asset Backed Security		Energy Efficiency	Low-carbon residential buildings	Calvert Investments	Pennsylvania Treasury Department, US Department of Energy	Co-investment	Warehousing and pooling, Syndication platform
National Australia Bank climate bond	2014	Australia	Climate bond	Climate Bond Standard (CBI)	Renewable Energy		Clean Energy Finance Corporation (CEFC), undisclosed investors	CEFC	Cornerstone Stake	

Note: The OECD database from where these examples are sourced focuses on institutional investment in sustainable infrastructure, with a focus on project-level interventions by public actors. It is important to note that, including bonds in this database comes with restrictions. Though bond transactions are often reported, the underlying projects rarely are. Even if single projects are reported in a bond transaction, if multiple investors are involved, it is hard to attribute the institutional investment to all projects, especially if the institutional investor was a minor holder. Due to these restrictions the database includes only bonds for single projects for which information on actors is available and clear.

Source: OECD Background Paper, 2018.

3.1.1 Products for Public Pathways: Non-Securitized Bonds

Most of the green bonds issued to date are corporate *use of proceeds* bonds that aim to fund environmentally sustainable projects or activities within an entity and will be secured by the entire balance sheet of the issuer. Such bonds are important providers of sustainable finance, as they give mainstream fixed income portfolio managers an opportunity for easily funding the entities that are directly financing the sustainable projects.

When banks issue the first of the above described type of bonds (i.e. standard use of proceeds bond), they are using the proceeds to fund lending to defined projects. This applies to private commercial banks as well as national development banks and other forms of sovereign, supranational and agency issuers.

KfW, Germany's flagship development agency is an example of a frequent issuer of green bonds where the proceeds are used to finance green lending activities. Owned by the Federal Republic of Germany (80%) and the Federal States (20%), KfW refinances its wide array of domestic and international activities primarily by issuing bonds in the international capital markets. In 2017, KfW's total new capital-market funding amounted to approx. € 78 billion. Investors in KfW bonds benefit from an explicit and direct statutory guarantee and institutional liability from the Federal Republic of Germany. As a result, KfW is regarded as an extremely safe credit rated Triple-A with stable outlook by major credit rating agencies.

In early 2018, IFC and Amundi, one of the largest European asset manager (€ 1.466 billion[5] AUM), partnered to launch the world's largest green bond fund. The fund is a first of its kind, as the focus is solely on Emerging Markets. The launch of this fund, namely Amundi Planet, Emerging Green One (AP EGO), was motivated by the recognition that environmental issues (climate change in particular) are increasingly on the radar of major long-term investors, yet there is still a lack of products to help clients align their portfolios with a sustainable economy that remains below the 2° Celsius. The fundraising campaign following the launch of AP EGO in February 2018 accumulated $1.4 billion from 16 institutional investors (e.g. Alecta, AP3, AP4, APK Pensionkasse, APK Vorsorgekasse AG, ERAFP, MP Pension, Crédit Agricole Assurances, LocalTapiola General Mutual Insurance Company, LocalTapiola Mutual Life Insurance Company, IFC, EIB, EBRD, Proparco, and other institutions). Box 2 presents further details about the AP EGO fund.

[5] Figure as of June 302018

BOX 1. CASE STUDY: AMUNDI PLANET EMERGING GREEN ONE

Amundi, the largest European asset manager, was selected by the IFC through a global tender offer to launch a green bond fund to deploy $2bn emerging markets: Amundi Planet Emerging Green One (AP EGO), the world's largest Green bond fund. The Fund is part of the Green Cornerstone Bond Program, which aims to facilitate the financing of the energy transition in emerging markets through the creation and development of a local green bond market.

The committed investor base includes Alecta, AP3, AP4, APK Pensionkasse, APK Vorsorgekasse AG, ERAFP, MP Pension, Crédit Agricole Assurances, LocalTapiola General Mutual Insurance Company, LocalTapiola Mutual Life Insurance Company, IFC, EIB, EBRD, Proparco, and other institutions. This marks a strong commitment to green finance and, for some, a first move into emerging markets and/or green bonds.

Sustainable Finance Product

The fund closed at $1.42 billion and is expected to deploy $2 billion into emerging markets green bonds over its lifetime, as proceeds are reinvested during 7 years. With a $256 million cornerstone commitment from IFC, the fund aims to increase the capacity of emerging market banks to fund climate-smart investments.

With a pragmatic approach, the fund combines (i) an IFC's risk sharing mechanism in the junior tranche that offered institutional investors an appropriate risk/return from the senior tranche in line with emerging market debt premium and (ii) a strategic focus on current and prospective domestic financial institutions issuing green bonds. With a Fund's focus on banks' green bonds, investors are only exposed to the risk associate with the financial institution of issuance and not the infrastructure projects. Financial institutions play the roles of intermediaries, offer some diversification, do the due diligence, implement the necessary currency swaps, etc. Thus, investors can now enter into emerging markets and in infrastructure financing, both of which are commonly labelled as 'too risky'.

AP EGO is the only green bond fund solely focused on investing and developing the green bond market in emerging countries. IFC is operating an innovative supply side work stream to compliment the Fund's investment thereby marking the project with the first comprehensive ecosystem approach for green bonds.

Challenges & Solutions

Risk perceptions. First, yield-starved institutional investors, who have the capacity and appetite to deploy capital in emerging countries, are limited in their ability to do so due to the higher risk perception of investing there. Thus, the fund was structured as a layered fund with three tranches, offering investors exposure to different risk/return profiles, based on their risk appetite. This enabled development finance institutions, namely IFC, EIB, EBRD and Proparco, to take first-loss positions in the junior tranche securing the senior tranche with more protection to enhance the investment case for institutional investors as they search for yield while delivering a positive societal impact.

Need for best practices. The fund's ESG policy, developed alongside IFC with input from EBRD, EIB, and Proparco, is based on three key pillars which represent current market best practices and will be an integral element for the investment decision-making process:

(i) an exclusion policy at the issuer level, based on the issuers' ESG scores and/or sector exclusions;

(ii) an assessment of the green bond framework focusing on both transparency and disclosure levels, and

(iii) seeking to ensure high performance standards of the green bonds (regarding environmental benefits).

These three pillars will enable Amundi to focus on green bonds supporting projects with the highest level of environmental benefits, ensure the promotion of green bond best practices, reinforcing market integrity for emerging markets and mitigating ESG risks that may cause reputational risks at the issuer or green bond level.

Lack of standardization and skills. There is growing investor interest for infrastructure investments as the assets offer a unique set of characteristics. There are predictable, long term, and have attractive returns. There is a low correlation with other asset classes and the investment helps financing socially useful projects. However, very few investors have succeeded in venturing into infrastructure as the assets are not standardized and the project analysis requires very specific skills with specialized teams. Additionally, the risks associated are commonly perceived as "too high" as most infrastructure deals have long durations with no exit options, which is a big risk in most markets. All of these are exacerbated for infrastructure projects in emerging markets where political and macroeconomic risks are magnified. AP EGO stands as one solution to overcome such risks. Specifically, MDBs, together with asset managers, can address some of the issues mentioned. For AP EGO, this was done by: (a) focus on standard assets as it invests into debt intermediated by banks; and (b) inclusion of a risk sharing mechanism with a first loss position provided by MDBs to mitigate the uncertainty stemming from emerging markets.

Key Outcomes & Impacts

Overall, AP EGO has underlined the critical role that financial innovation can play in addressing sustainability issues, such as climate change. Specifically, it has accommodated institutional investor preferences and challenges in today's low yield environment as well as it has injected support for emerging green bond market in line with best market practices.

Having on boarded renowned institutional investors, the successful closing of the AP EGO acts as a first step in encouraging them to potentially adjust their internal governance capacities, to approve investments that are not entirely consistent with traditional asset allocation classifications.

With its portfolio nearly fully invested (into sovereign, quasi-sovereign and other bonds), AP EGO's careful selection of green bonds over the seven-year transition period to a 100% green bond portfolio is guiding this market in developing countries to be aligned with international best practices. The demand injection signals emerging market's green bond issuers to align themselves with AP EGO's criteria to access a new source of funding and motivating an increase in activities eligible.

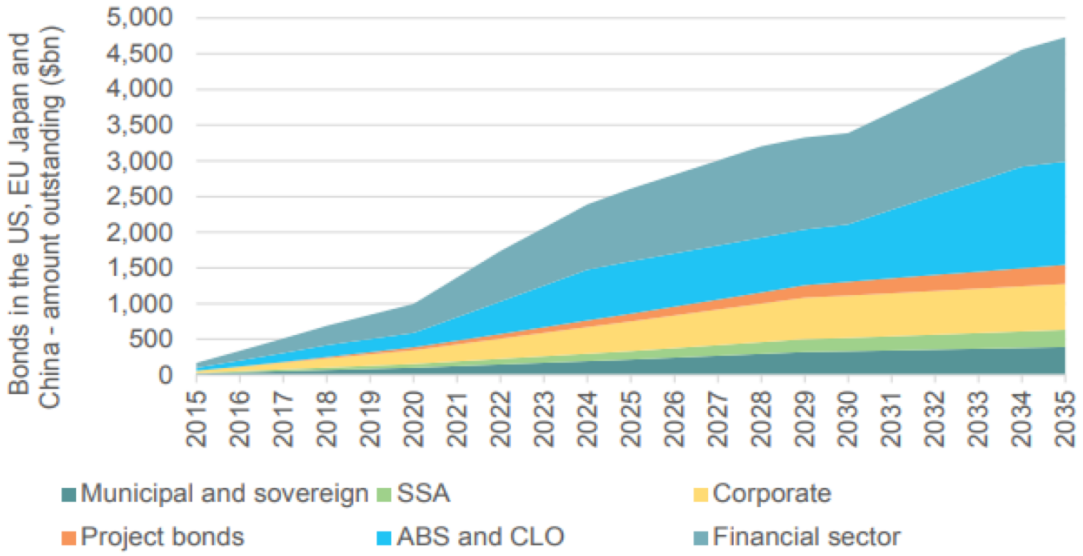
3.1.1.1 Securitizised bonds

In addition to corporate issuer-backed use of proceed bonds that target sustainable projects, the bond market can play a significantly larger role when aggregating bank loans and issuing asset-level (backed, supported or linked) bonds targeting sustainable projects. Using aggregation, private and bespoke sustainable loans can be transformed into sustainable debt products and mainstreamed for the benefit of long-term institutional investors.

These securitized bonds consists of banks or financial corporates identifying, tagging and pooling loans or receivables targeting environmental or social sustainability outcomes, and selling them as a bond inside a special purpose vehicle (SPV). These bonds tend to be "true sales" and move risk off of banks' balance sheets.

According to quantitative analysis by the OECD, annual ABS and CLO issuance is seen as having the potential to reach US$280-380 billion in the 2031-35 period in the baseline and enhanced securitization scenarios, respectively (or between 44% and 52% of annual issuance). Chart 5 developed by the OECD for the SFSG, shows the projected growth of the sustainable bond market during the period 2015-35.[61] As can be seen, the second fastest growth segment relates to ABSs and CLOs, which offer the greatest potential to the public pathway to move sustainable loans out of banks' balance sheets. It is clear this public pathway to the debt capital markets offers great opportunity to spur sustainable growth by providing funding at scale and in a format that is required for long-term institutional investors. Further, if sustainable infrastructure CLO's can be developed at scale to meet the US$ 100 trillion demand required by 2035, the volumes for securitized bonds could be meaningfully larger than the OECD estimate.

Chart 5: Sustainable Bonds by Type 2015-2035



Source: OECD

There is potential for a significant expansion in the origination and subsequent issuance of ABS as perceived risks fall.[62] The standardization of projects and policy support can enable the pooling of individual loans, which effectively ties bonds to a group of assets, rather than to individual assets or corporates. Compared to project bonds that generally back individual projects (or collections of larger scale assets concentrated in wind and solar farms), ABS are more efficient vehicles for aggregating pools of individual loans and diversifies assets and risk.

Looking to mobilize funds from institutional investors at scale toward small-scale generation of renewable energy and energy efficiency developed by Energy Efficiency Companies (ESCOs), the Inter-American Development Bank Group (IDBG) launched in 2015 the "Capital Markets Solution for Energy Efficiency Financing" project. The latter is the first small scale energy efficiency projects aggregation platform for issuing a new asset

class to be issued in the Latin America and the Caribbean (LAC) capital markets. The project consists of a two-step financing mechanism:

1. Accumulation: An IDB senior revolving loan (warehouse line) was given to a Special Purpose Vehicle (SPV) established to finance, standardize and accumulate small scale renewable energy (RE) and energy efficiency (EE) projects developed by ESCOs for their further securitization.
2. Mobilization: Credit enhancements was provided in the form of a Credit Guarantees to support the securitized bonds to be issued in the local or international capital markets. The proceeds of the bonds refinance the warehousing line and make it available again for a new Accumulation cycle.

The debt service of the bonds is backed by the cash flow generated by the RE and EE of the underlying projects. The case of the energy efficiency ABS in México is one case falling under this project, and is presented in detail in the Box 2. In this case, the IDB purchased receivables of small energy efficiency projects and issued a green ABS. This will be the first energy efficiency backed bond to be issued globally and to be sold in the regions' local capital markets. The Project would create a demonstration effect and know-how relevant for enhancing the "market readiness" and appetite for "green" asset backed securities in Mexico and beyond in LAC. It contributes to the development of the domestic capital market and fosters social and environmental responsible investments among local institutional investors.

BOX 2. CASE STUDY: IDB ENERGY EFFICIENCY ABS

Since 2012 Mexico has established a comprehensive climate change policy framework, but despite many efforts, energy intensity remained stable and emissions had steadily increased. EE is one opportunity with the greatest potential to lower production costs and improve business productivity, while simultaneously reducing GHG emissions. This EE potential has fuelled the creation of ESCOs who can offer comprehensive solutions to companies interested in investing in energy efficiency. However, several barriers remain to develop the market. Local financial institutions (LFIs) are often conservative when lending to private sector companies and have also limited expertise and capacity to market, assess and structure energy efficiency financing. This results in LFIs' preference for short term, collateral-based lending schemes against a company's balance sheet, which are often not well suited for EE projects financing. This lack of knowledge and risk appetite leads, in turn, to inadequate financing terms for these private sector initiatives in EE. At the same time, ESCOs are usually SMEs with a limited size balance sheet, resulting in LFIs pricing-in a higher risk, which results in high collateral, high interest rate and short-term tenors (up to 1 year) making the loan terms for EE projects inadequate. Therefore, private sector EE initiatives are lacking sufficient and adequate financing.

Sustainable Finance Product

- Senior lenders: IDBG loan (US$ 50 million senior revolving credit line -warehouse line-); IDBG Guarantee (US$ 56 million); Clean Technology Fund (US$ 19 million guarantee)

- ESCOs equity: US$ 10 million
- Institutional Investors: up to US$ 200 million distributed in at least two bond issuances.
- Key Terms: the loan tenor 3-year senior revolving facility with an availability period of 6 years; and the bond tenor is expected to have up to 15-year legal maturity.
- Structural Features. The financial solution entails a revolving credit line to a trust established in a local financial institution and administrated by a qualified asset manager. The credit line pre-finance EE and RE projects originated by the ESCOs under a predefine eligibility. The asset manager aggregates EE and RE receivables in the trust until it reaches a critical mass for the trust to issue a long-term bond.
- Additionality: The concessional finance tranche was structured so that to provide credit comfort to the senior lender and improve the credit profile of the bond to meet institutional investors risk appetite. There is clear rationale for the use of concessional finance given the context, the barriers to private investments in small scale RE and EE in the country, and the need to structure an asset attractive to investors.
- Crowding-in: The Project's approach targets key barriers hindering enhanced private investments in EE and, particularly, institutional investors' appetite for small-scale RE and EE projects.
- Commercial sustainability: The Project's contributes to the development of the local capital market and of the local EE market, thereby paving the way to commercial viability.

Challenges & Solutions

Among the key challenges faced to develop the EE ABS, were:

(a) Lack of adequate financing for demand-side energy efficiency projects. In particular, inadequate terms and conditions, and lack of long-term financing

(b) LFIs perceived risk in financing novel and/or unproven EE technologies/projects. Lack of historical data on EE projects performance.

(c) Challenges-related to the issuance of new asset classes in capital markets e.g. issuance size requirements; gaps in the legal and regulatory environment, shortcomings in the capital market infrastructure; and lack of familiarity of local investors with the performance of the underlying EE assets.

To overcome these barriers, several approaches were used, one being creating blended finance solutions that played very specific roles, such as:

- Provide credit protection for portfolio concentrations periods (early stages of the warehousing line).
- Provide Credit enhancement to meet investors' risk appetite, providing enough credit protection to the bonds to achieve a strong credit rating and to attract local institutional investors
- Increase the size and set more adequate lending rates for the warehouse line
- Enable the second opinion of the bond issued labelled as "Green Bond", according to international guidelines.

Key Outcomes & Impacts[6]

- This financing solution has created capacity building among the ESCOs in structuring small-scale projects to build bankable project pipelines. Also, unlocking financing to ESCOs have help them scale their offer of energy efficiency solutions to mid-size companies.
- Companies can implement energy efficiency measures without incurring in upfront costs.
- The financing vehicle has accumulated 10+ projects whose aggregated cashflows allows critical mass for a securitization.
- Each project has energy saving of 15% from their baseline and in average annual reductions of 3,000 tCO2e

Key lessons learned

- First loss guarantees during the aggregation phase are fundamental to lower the risk of portfolio concentration
- Financing for small scale projects must be in local currency to avoid exchange risk
- Fixed interest rates are preferred as these are less risky for investors (borrower and bond buyer)
- Project eligibility criteria are fundamental to maintain portfolio credit quality, but it should be flexible to allow the entrance of more EE and RE projects from SME companies
- Simple M&V processes for measuring energy savings under ESCOs are important
- Awareness campaigns on the economic benefits of EE shall be implemented in parallel to the launching of the program
- Invest in developing more capacity building for other ESCOs to join the program (i.e. scalability)
- A key success factor has been the finding that pre-defined project eligibility criteria and contract standardization has facilitated the credit analysis process of the lender.

Looking forward, inputs provided by SEB, White & Case, Standard and Poors, Oz Management, ICMA foresee three spaces where ABS may find particular fertile ground to grow and scale sustainable finance. Among these sectors, the following were presented:

Auto ABS. Several European countries including France, Germany, Norway, and the UK have pledged to phase out the sale of fossil fuel-powered cars in the next 7 to 25 years. Achieving this will demand considerable investment in research and development, since hybrid and fully electric vehicles currently make up a very small fraction of those on the road. Yet, the potential pools of sustainable auto loans are now sufficiently deep to make sustainable securitisation of these assets viable and profitable. Plus, several high-profile car manufacturers have recently issued auto ABS backed by leases on existing electric vehicles. Furthermore, ride-hailing companies are pouring significant research and development resources into electric autonomous taxis for use in cities. The means of

[6] To date, the bond will be issued in 2019.

financing these new fleets of vehicles would be prime candidates for forming the basis of sustainable auto ABS.

Solar ABS. Solar energy is one of the front running alternatives of renewable energies for electricity generation both commercially and for residential use. Solar energy can be generated by anyone and once the technology is installed, the owner effectively produces free energy, surpluses of which can be sold back to national grids. Solar securitisations topped $1bn in 2017, more than quadrupling issuance from the previous year. As with electric vehicles, significant resources are being pumped into researching and improving solar cell technology. As new materials are developed to increase conversion efficiency and respond to aesthetics aspects, demand for solar technology at the residential and commercial level is likely to increase significantly. This demand will be funded by loans which may then in turn be leveraged and made available to a broader range of market participants through solar ABS. This simultaneously shifts solar loans off the finance provider's balance sheets to allow for more loans to be agreed.

PACE ABS. PACE loans are bespoke mechanisms through which public bodies fund sustainable retrofitting of commercial and residential properties. They incentivise property owners to make upgrades to their homes as the loans are repaid over time through an assessment on the property owner's tax bill. Successful PACE programmes now exist throughout the US, Canada, South Africa and Australia and the concept is now gaining traction in Europe as a solution to the huge investment deficit in sustainable infrastructure. Like other sustainable loans, PACE loans can be aggregated and securitised, freeing up the originator's balance sheet and facilitating investment in the asset class by institutional investors. Several issuers have already taken advantage of the prevalence of the asset class in the US and more debut issuances are expected throughout 2018. An example of how PACE style ABS transactions are considered as having a high green contribution is reflected in the Green Evaluation by S&P Global Ratings on Ygrene Energy Fund in April 2018.[66]

Notwithstanding these opportunities, a World Bank (2018) study on trends for ESG in fixed income investing highlight some "areas of fixed income, such as private debt, covered bonds or asset backed securities, have little coverage, so far" as well as ESG application.[67] This report also suggests that "ESG analysis of ABS needs to capture risks relating to the originator of the securities, the servicer and the 'cover pool' of assets, respectively", and investors should consider "how ESG factors might affect the financial sustainability of 'asset pools' or standalone projects covering the security, such as auto loans and mortgages."[69] In some cases, investors focus on the use of proceeds for a particular ABS issued (monitoring the composition and changes in the pool of assets).[70]

Within the ABS space, the sustainable or green mortgage-backed securities (MBS) have been gaining traction in the past years, especially given that, as the IFC (2018) explains,

infrastructure and green buildings are the main underlying type of investment popping up from the NDCs.[7, 72]

In 2017, for example, the French corporate and investment bank Natixis issued its first green commercial mortgage-backed securitization (CMBS); which was oversubscribed after being met with strong demand from both U.S. and overseas investors.[73] This involved the launch of the first green tranche in a US CMBS deal.

In the residential space, sustainable securitization activities are taking place as well. Sustainable residential mortgages can be offered to homeowners under which the money saved through proposed energy efficiency upgrades in the relevant property is added on to the mortgagor's income for the purposes of calculating the level of funds that may be borrowed. Obivion, the largest mortgage lender in the Netherlands, issued a €550 million ($613.5 million) residential mortgage-backed security that settled in May 2018. It is encouraging to learn that it was actually slightly larger than its inaugural €500 million green bond from 2016.[74] The use of proceeds from the 2018 RMBS will go to new residential buildings built after 2002 that represent the top 15% in terms of energy performance, or residential buildings built before 2002 that have achieved at least a 30% improvement in energy performance. This green bond is part of Obvion's residential mortgage securitisation programme known as STORM, which has about €17.9 billion of outstanding securities. Box 3 summarizes the the deal's highlights.

[BOX 3. OBIVION'S DEAL HIGHLIGHTS]

Maturity: five years weighted average life (WAL)

Coupon: 17 bps above three-month Euribor

Use of proceeds: Residential buildings

Credit rating: Aaa (Moody's), AAA (S&P)

Lead managers: Rabobank, Société Générale

External review: Sustainalytics

Through sustainable residential MBS ("RMBS"), these mortgages are securitised and tranched according to prospective investors' desired risk-return profile. Sustainable RMBS has the potential to become a substantial source of funding for green mortgages, which could subsequently free up balance sheets to allow financial institutions to underwrite more sustainable mortgages thus creating a sustainable funding circle. This would also simultaneously help relieve some of the housing sector issues currently facing some EU governments while stimulating economic growth and stability in the housing and mortgage sectors. Sustainable RMBS market was propelled into the market's consciousness following Obvion's "Green Storm" RMBS issuances in 2016 and 2017 and other issuers are gearing up to follow suit. This year, the EU will pilot an energy efficient mortgages

[7] It is important noting that while the investment universe in the IFC paper (2018) covers climate related investments – i.e. investments that have an impact on climate mitigation and/or climate adaptation – some of the related financial sector policies may cover a broader universe of sustainable finance needs, as do some of the financial instruments such as green bonds.

programme which should lead to an upsurge in sustainable mortgage origination, which may in turn be used to underlie sustainable RMBS[8].

The availability of internationally recognised standards of building sustainability: LEED, BREEAM and Energy Star make it possible to determine the eligibility of these assets to form the basis of a sustainable structured product straightforward. It also gives investors comfort that the assets backing MBS meet their own sustainability requirements.

The EeMAP* Initiative aims to create a standardised "energy efficient mortgage" based on a private bank financing mechanism with preferential interest rates for energy efficient homes and/or additional funds for retrofitting homes at the time of purchase.

CASE 4. FANNIE MAE GREEN MBS

The Federal National Mortgage Association is a United States government-sponsored enterprise, founded in 1938. Fannie Mae's mission is to provide access to reliable, affordable mortgage financing in all markets. The aim of Fannie Mae is to expand the secondary mortgage market by securitizing mortgages in the form of mortgage-backed securities (MBS), while reducing the reliance on local savings and loan associations.

Fannie Mae's business model is based on borrowing at low rates in the debt markets, and then reinvesting into whole mortgages and mortgage backed securities. It purchases whole loans and then securitizes them for the investment market by creating MBS that are either retained or sold.

As a Government Sponsored Enterprise, Fannie Mae is compelled by law to provide liquidity to mortgage originators in all economic conditions. Due to the size, scale, and scope of the United States single-family residential and commercial residential markets, market participants viewed Fannie Mae corporate debt as having a very high probability of being repaid. Fannie Mae is able to borrow very inexpensively in the debt markets as a consequence of market perception.

Sustainable Finance Product

In 2017, Fannie Mae issued $27.6 billion in Green MBS backed by either green building certified properties or properties targeting a reduction in energy or water consumption, up from $3.6 billion in 2016 and $111 million in 2015. The company priced its first Fannie Mae GeMS REMIC tranches backed exclusively by its Green MBS collateral in February 2017.[76]

To get here, Fannie Mae started in 2011 launching Green Financing products to the market, issuing green lending products to reward greener homes or incentivise energy refurbishments and retrofits. These all apply to the multifamily apartment market where the borrower is typically a property investor or developer (rather than the individual home occupier). These loans are then securitized as Green MBS.

Green Financing volume in 2017 raised to $27.6 billion, 6 times the volume financed in 2016 of $3.6 billion.[77] The Multi-Family Green Financing Loans includes:

1. The 'Green Rewards' program, offering preferential pricing (at least 10 basis points), additional loan proceeds and a free energy and water audit report to borrowers who commit to developing green property improvements projected to reduce the whole property's annual energy or water use by at least 25%[78],[79]
2. The 'Green Preservation Plus' programme, providing additional loan proceeds to finance energy and water efficiency improvements for existing Multifamily Affordable Housing (MAH) properties.
3. The 'Green Building Certification Pricing Break' which rewards buildings with recognised green certification (e.g. EnergyStar or LEED) with preferential pricing on the loan.

4. The new program called “Healthy Housing Rewards” provides 15 basis point interest rate reduction on affordable properties with health-promoting design[80] or 30 basis point reduction on enhanced resident services.[81] Fannie Mae will reimburse Lender $6.500 for the cost of FitWell certification. Borrower and property must obtain CORES Certification (borrower) and ERS Property Certification (property) for the life of the loan. Properties must include at least 60% of units serving tenants who are at or below 60% of the area median income (AMI), and eligible properties can choose to participate in one (but not both) of the program options.[82]

Over the last few years, Green Financing programs for the multi-family sector have been some of the most competitive and robust in the commercial real estate industry.[83]

Challenges & Solutions

These products enable the disclosure of the loan as a ‘Green MBS’ (mortgage backed securities) to the bond market providing liquidity advantages.

Benefits and suitability for long-term investors:

Guaranty of timely payment of principal and interest; Superior Call and Extension Protection; Lower spread volatility relative to other products with similar collateral; Stable cash flows that are easy to model

Key Outcomes & Impacts

Financial: Lower credit risk, higher cash flows, and higher property value.

Social: Greater affordability and higher quality, healthier, more durable housing.

Environmental: Lower use of energy and water resources, and greater resiliency.

Green Financing provided positive and measurable financial, social, and environmental savings to property owners, tenants, lenders, and investors. When green improvements are made and the tenants pay the utility bills, tenants may see their utility bills decrease by about $125 annually – that’s money they can spend on other expenses like education, transportation, healthcare, or child care.

Another variation of sustainable loan aggregation that could employed to scale up sustainable finance and catalyze institutional capital is that of covered bonds. The progressive diversification of the green bond market has opened up space for new debt products including green covered bonds. Sustainable covered bonds are sustainable asset-supported bonds that possess the guarantee of the issuer. Covered bonds carry the guarantee of an issuing bank and use pledged loans as additional collateral. In this case, the banks still own the loans but get superior pricing due to the credit enhancement of the green collateral. Although covered bonds do not transfer risk off of banks’ balance sheets, it is still an important tool to reduce cost of funds and reach a deeper liquidity pool by expanding their investor base. While with true sale asset-backed security investors rely on the cash flow and value of the underlying assets; with covered bonds, these remain on the issuing bank’s balance sheet. Only performing assets are included in the cover pool.[84]

The first green covered bond was issued in Germany in 2016 –namely, it was BerlinHyp’s first green Pfandbrief. Pfandbriefe are the dominant class of German-law covered bonds. They are issued on a well-founded legal basis, most specifically the Pfandbrief Act and several regulations. Based on its Green Bond Program, Berlin Hyp issues green bonds

either as covered bonds (Green Pfandbriefe) or as senior unsecured bonds (Green Senior) and uses the proceeds of these bonds for refinancing green assets. All eligible assets are loans for the acquisition, the construction or the refurbishment of green buildings on Berlin Hyp's balance sheet and are part of its mortgage cover pool in the case of Green Pfandbriefe. With approximately € 27bn of total assets, Berlin Hyp is a medium-sized German mortgage bank that specializes in large-volume real estate financing for professional investors and housing societies, and developing customised financing solutions for them. Its most important refinancing instrument is the Mortgage Pfandbrief. It was the first issuer to successfully place a covered bond with a negative yield at issuance on the market. Almost one year prior to that, in April 2015, the bank became the first issuer of a Green Pfandbrief, i.e. a Mortgage Pfandbrief that is used to refinance loans for green buildings. The bank's sustainability management focuses on integrating aspects of environmental awareness, social responsibility and good corporate governance in its business throughout the entire value chain. Berlin Hyp's intention to create a Green Pfandbrief goes back to 2009, when the bank first thought about creating a sustainable covered bond instrument. Box 5 summarizes the the deal's highlights.

Following Berlin Hyp's bond, there have been several other issuances of sustainable covered bonds. The Spanish cooperative bank, Caja Rural Navarra Covered Bonds, has issued sustainable covered bonds for a total amount of € 1 billion (US$1.16 billion) according to its Sustainability Bond Framework. The Bank of China expanded its international investor base and liquidity by having "green loans" on its balance sheet "tagged" and used as additional security in a green covered bond issued in London. Further, the green over-collateralization of loans allowed the bank to obtain superior pricing. The Bank of China issued a 'dual recourse' green bond in November 2016. The cover pool of the US$ 500 million issuance is made up of Chinese climate-aligned bonds on the banks' balance sheets. The bonds are part of the ChinaBond China Climate Aligned Bond Index, developed by CCDC, CECEP and Climate Bonds.[85]

Turkey has initiated some steps into developing this market as well. One example is the US$150 million equivalent of Turkish lira invested by the IFC in covered bonds aimed at helping to boost the development of green buildings in the country's housing sector. The five-year maturity bond is backed by a portfolio of residential mortgages. Half of IFC's funds will be used to provide green mortgages for the purchase of energy-efficient housing. The bond is issued as part of Garanti Bank's € 5 billion covered bonds program, launched in 2015 and a relatively new funding instrument in Turkey's capital markets. The bank expects its green housing loans portfolio to be worth US$100 million by the end of 2020. In a similar transaction, in October 2017, IFC also invested US$150 million in Turkish Lira equivalent in covered bonds issued by Turkey's Yapi Kredi Bank, to help strengthen the country's capital markets and boost its residential mortgage sector, including green mortgages. IFC's investment in the issuance aims to support Turkey's nascent covered bond market. The bond has a five-year maturity and is issued as part of Yapi Kredi Bank's €1 billion covered bonds program launched in 2016. At least 15 percent of IFC's funds will be used to provide green mortgages for the purchase of energy-efficient

housing. Yapi Kredi Bank expects its green housing loans portfolio to be worth US$250 million by the end of 2021. By offering green mortgages, banks increase the purchasing power of buyers by folding in the costs of the home's improvements. Buyers can thus pay for features that lower utility bills, while banks can offer new loans.[86]

A CBI's briefing paper on covered bonds (2017) highlights many markets benefit already from the opportunity of issuing covered bonds as legislation was introduced in almost forty countries, yet, "only a handful of nations dominate the market".[87] And an analysis by S&P Global Ratings informs, there is still plenty of scope for growth despite the growth in issuance, having the "volume of green covered bonds only represent[ing] a fraction of the broader covered bonds market."[88] In the context of facilitating the growth of this market, it is encouraging to learn that the Covered Bond Label Foundation (CBLF), implemented in 2017 an enhanced set of features to allow for Sustainable Covered Bonds.[89]

Finally, the previously cited World Bank (2018) study, highlights that, similar as in the case of ABS, in the case of sustainable covered bonds, "investors should consider ESG risks relating to the issuer and the sustainability of the assets themselves," explaining that "if a bank seizes a defaulted issuers' assets, it also takes on its liabilities, which may include fines, ongoing legal costs and environmental clean-ups."[90]

As stated earlier, sustainable borrowers are becoming increasingly diverse in terms of profile and use of sustainable use-allocated funds. For example, oil companies are increasingly investing in renewable energy projects and innovations such as electric aircraft. Further, sustainable CLOs are building up to take their place as a pillar of the sustainable securitisation growing activity. Given the supply of assets for this financial product is plentiful and the vast commitments by financial institutions to increase the quantity of sustainable loans on their books[91], this trend looks set to continue. Furthermore, it is notable that CLOs provide approaching 70% and 40% of the debt capital to non-investment grade companies in the U.S. and Europe respectively, providing US$ 1.1 trillion of capital in aggregate and supporting millions of jobs.[92] Such numbers could be replicated with sustainable infrastructure sector as the complex and long dated infrastructure loans lend themselves well to the managed asset CLO structure.

Sustainable CLOs are made up of existing sustainable loans on banks' balance sheets and are a valuable tool to remain within regulatory capital limitations on the amount of loans banks can have on their balance sheets at any given time. Further, banks often increase their loanA feature of CLO-backed securities is that they are issued by an SPV, which effectively 'buys' the loan obligations off the originating bank. Importantly, this means the loans are moved off the balance sheet of the originating bank into an SPV, freeing up capital and enabling the bank to agree more sustainable loans.

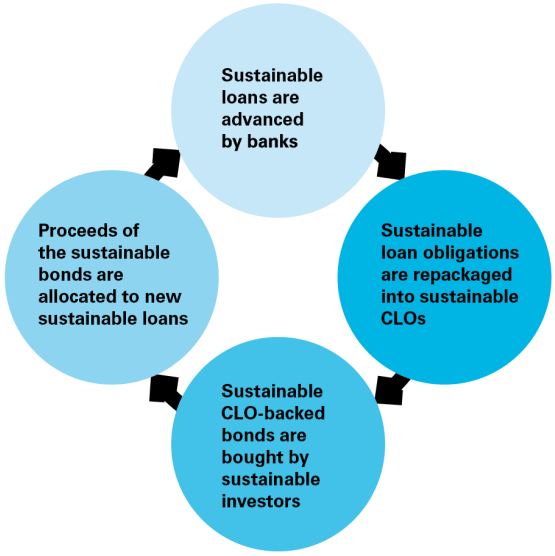
Bonds are issued by a CLO vehicle (SPV) and the bonds acts as the liabilities. The proceeds from the bond issuance are used to purchase participations in loans. The interest payments from these loans that reside within the SPV are used to pay the coupon on the bond that was issued. In this way, asset managers who can oversee many SPVs that are populated with loans can issue sustainability-targeting bonds to purchase

sustainable loans, manage the loans and pay the bond coupon with proceeds from the pool of loans. Traditionally, CLOs have been populated by leveraged loans and high-yield bonds. A sustainable CLO would purchase sustainable debt directly from a bank, involving a true sale and a reduction of risk exposure from the banks' balance sheets. This is a powerful structure that could be re-purposed for long-term sustainable loans, providing many benefits. First, loan amounts and tenors tend to be smaller than bond issuances and are increasingly accessible by a greater range of entities including SMEs and individuals (although sustainable infrastructure loans will have long tenors and this is also an attractive element for many institutional investors). This implies better opportunities to address smaller-scale project finance. Second, the scaling up of these smaller loans makes the return on the income streams more commercially attractive. Third, a key characteristic of this structure is its flexibility. Unlike sustainability-targeting bonds, bank loans are governed predominantly by a set of (bilateral) contracts, so the loan documentation can be tailored to individual circumstances. Finally, a CLO may be a more desirable structure than a classic ABS bond that would be issued directly from a bank as the underlying loans to energy assets are complex and need the expertise in the sector provided by the CLO managers to oversee the management of the pool of complex loans over a long period of time.

Through CLOs, originating banks can create a "sustainable finance loop" which generates sustainable assets on a rolling basis (see Figure 1). The proceeds from the sustainable CLOs form the basis of new loans from the originating bank with its clear balance sheet. The loop is formed as these second generation loans are themselves aggregated and transferred to an SPV to issue more CLO-backed securities and the process may be repeated.

A number of relevant innovations in the CLO space have started to occur. There are two Chinese debt securities that are tagged on the Bloomberg terminal as green CLOs; Xing Yuan and Xing Yin Loan Asset Security Trusts issued over the course of 2014-16; however these vehicles appear to be synthetic regulatory capital trades rather than cash CLOs of the sort discussed in this white paper. Permira Debt Managers (PDM) is believed to have issued the first European CLO (Providus CLO I) that includes language in the documentation around environment, social, and governance (ESG) and sustainability criteria. The ESG eligibility criteria included restrictions on the nature of industries in which the fund will invest, and a commitment to assess ESG issues ahead of the investment decision. Such approach is viewed as a matter of principle as much as a preventative approach, helping limit exposure to areas that may be subject to regulation, and other factors, thus, reducing risk.

Figure 1. The "Sustainable Finance Loop"



Source: White & Case

Where loan assets are less readily available, they can be warehoused by the SPV until a critical mass has accumulated to make issuing CLO-backed securities viable. This warehousing feature will also ensure a consistent supply of sustainable loans forming the basis of the CLO in the event that individual assets in the pool cease to meet the sustainability criteria.

Figure 2. The "Sustainable Finance Loop"

The portfolio assets are actively managed and capable of being replaced or substituted where the purpose of the CLO is the creation of profit, generated by achieving a rate of return on the CLO portfolio which is higher than the cost of servicing the debt on the CLO securities.

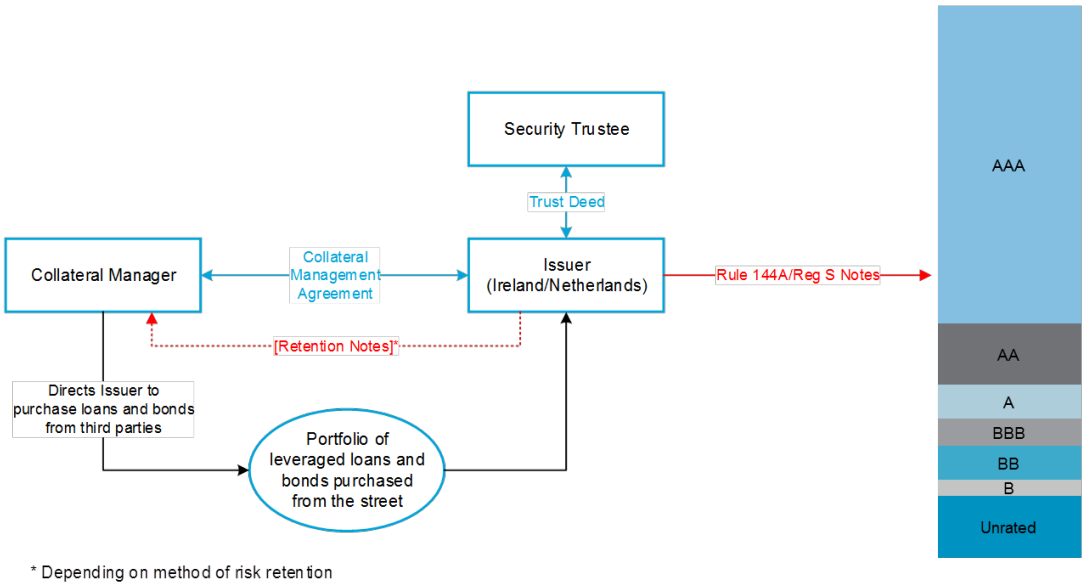
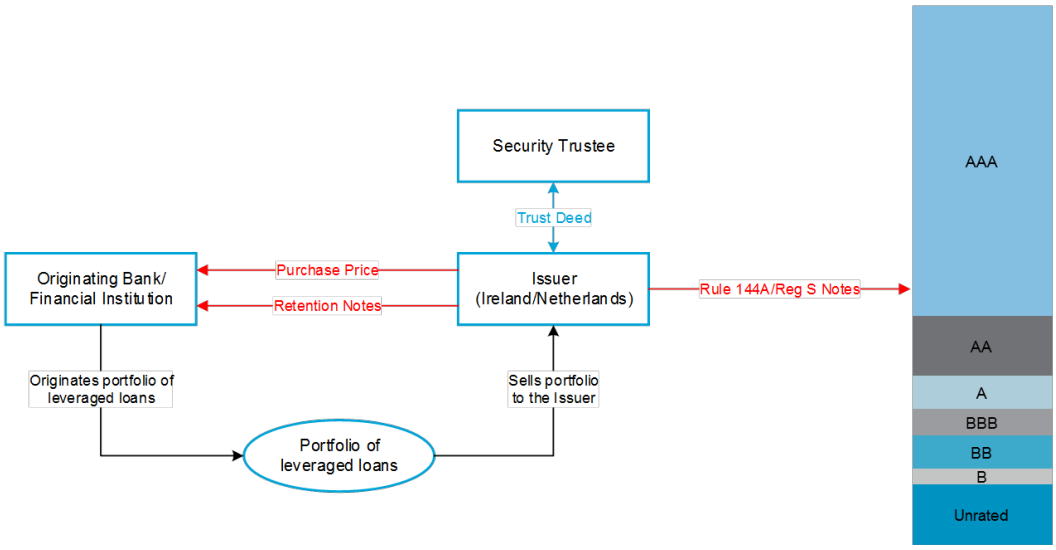


Figure 3. The "Sustainable Finance Loop".

The assets comprising the portfolio of a balance sheet CLO remains largely unchanged and the purpose of the CLO is to remove assets from an originator's balance sheet in order to achieve regulatory capital relief against its loan book.



Although the DCMs are considerable in size, there are very specific barriers to small but growing sustainable DCMs as well as positive options for countries to employ them for sustainable growth that will be addressed in the proceeding chapters.

3.2 Private Pathways to Move Sustainable Loans

Besides the public pathways and the related sustainable financial products to channel institutional capital described above, there are also private pathways and alternative origination methods whereby sustainable loans are transferred, originated or delivered to institutional investors or other long-term investors.[95] These pathways provide complementary channels for institutional investors to support scaling sustainable debt financing, and their inclusion in this paper responds to widening up the range of possible options for countries to be able to cherry pick according to their existing capital market structures and dynamics within banking and investment market. The following are possible private pathways identified to offer opportunities to scale up sustainable debt finance:

P*rivate placements of sustainable loans or notes from banks to long-term investors.* A private placement happens among a generally small number of selected investors for the sale (*i.e.* placement) of securities, as opposed to being offered to any investor in the open public market. As a working paper by the European Investment Fund (EIF) explains, in the cases of bilateral lending and private placement, the non-bank institution develops a dedicated expertise to screen and select suitable borrowers or projects and be able to invest responsibly in loans.[96]

The private placement market is well developed in some jurisdictions, namely in the US, where this market has enabled insurance companies to finance corporates for decades, also benefiting from a specific credit assessment infrastructure.[97] The private sales teams and resources within banks "syndicate" large loans but often conduct private placement sales of non-listed, non-public sustainable debt that can take the form of a loan or an unlisted (144a) bond. In general, non-bank lending and private placements have been growing. It is worth noting that large insurance companies, such as Allianz and AXA, have recently announced the set-up of new dedicated debt teams to invest in corporate loans, commercial real estate, and infrastructure projects.

One example of a private placement for supporting the financing of projects with socio-environmental benefits has been Anthony Veder Group, a gas shipping holding, certified sustainable shipping loan – first of its kind. ABN AMRO acted as the sole arranger and succeeded in its € 66 million European Private Placement to finance the building of the 18,000 cubic metre Ice Class 1A Super LNG carrier Coral EnergICE which uses the boil off of its cargo to fuel the propulsion of the vessel. The transaction was fully certified according to the Clean Shipping Index Guidelines by Bureau Veritas, which also verified the green credentials of this transaction. Among the targeted environmental improvements were: eliminating the usage of heavy fuel oil (HFO), thus reducing CO^2 emissions, nitrogen oxide emissions (NOx) and almost 100% of sulphur emissions (SOx) and particulate matter emissions; and reducing impact of marine life. The 20 year transaction was placed with Delta Lloyd Asset Management.

One generic instrument being used recently to help deploy capital towards sustainable projects has been the synthetic securitization (i.e. where credit risk is transferred to the capital markets through aggregated loans via credit derivatives or guarantees). Two

examples come through Mariner Investment Group. The latest one is the recent credit protection bought by the African development Bank (AfDB) on a US$ 1 billion portfolio of loans. Through the transaction, the group of investors, led by Mariner Investment Group, takes on US$152 million of default risk on the portfolio without acquiring the assets and in exchange for returns. Loans remain on the AfDB's balance sheets, but with a lower risk weight, allowing it to free up capital for US$600 million new lending for renewable energy projects in Africa under rating agency risk weighting methodologies. Another example is that of the socially responsible US$3 billion private synthetic risk transfer from the French bank Crédit Agricole CIB to Mariner Investment Group through a Green Capital Note. The transaction aims to free up regulatory capital and redeploy it towards new lending for green sectors in line with achieving the SDGs.

Development of sustainable asset funds and management companies. Asset management companies encapsulate both large global corporations to small family investment offices. Asset managers facilitate sustainable debt investments on behalf of asset owners including sovereign wealth funds, pension funds, insurance funds, high net worth individuals and the public. For example, some asset managers are specialising in originating green commercial mortgages for their investors, for example Hermes Investment Management. This UK-based Asset Manager underwrites its own sustainable debt and equity for energy-efficient and sustainable commercial real estate. The Hermes Investment Management has determined that its focus on ESG factors delivers superior returns and a reduced risk of default.

Another interesting case is Iona Capital ("Iona"), a UK-based asset manager that directly underwrites subordinate debt in environmental infrastructure projects. Iona was established in 2011 as a specialist fund manager investing in bio-energy infrastructure projects in the UK and has served pension funds to access sustainable projects cash flows. Iona has recognized two very instructive trends that drove the development of its business model. First, although the assets under management of institutional investors have grown significantly over the last twenty years, their role in infrastructure investment has historically been vanishingly small.[102] Second, the growth in renewable energy infrastructure is seeing a movement away from large centralised energy generation (nuclear, coal and gas fired powered stations) towards a system involving a mixture of centralised sources of power (major hydro, wind and solar) and transmission, and a broader distributed energy landscape that incorporates localised generation, transmission and back up. Having acknowledged this, Iona's business model is structured to overcome the constraints of traditional approaches to funding centralised energy infrastructure - project finance – and to cater to the demand of capital by the increasing smaller distributed energy projects. Iona has identified that the nature of security, contracted cashflows and legal documentation are all different in decentralised projects. Iona's case is particularly illustrative of how asset managers can play a role in channeling institutional capital and help respond to bot the need for sustainable infrastructure financing and innovation.

From a different angle, Clarmondial, a sustainable investment advisory firm, recently established the Food Securities Fund to develop an institutional investment-quality product that supports sustainable agricultural value chains in emerging markets. This fixed income fund will essentially create an on-going, scalable funding solution that allows institutional investors to support the responsible parts of such value chains, with a clear focus on creating positive impact outcomes in rural areas –e.g. on rural jobs, sustainable agriculture and improve governance. The fund is also unique in that it uses blended finance from public and private sources –an increasing need identified by the firm. Furthermore, they identified an unmet demand for commercial impact-oriented fixed income opportunities among institutional investors, in particular in the US and Europe. On one side, the fund is structured as a "standard" regulated fixed income fund, providing institutional investors with the type of liquidity and risk-adjusted returns they seek. On the other side, the fund applies an innovative approach to source deals efficiently and de-risking that enables it to lend to agricultural SMEs in emerging markets. Complementing this, there is an ongoing process to improve the environmental impact data and reporting practices in the agricultural sector in collaboration with other lenders and real asset investors.

In relation to sustainable debt funds, there are no generally accepted definitions and the range of structures varies. In a specialized loan fund, a fund manager pools a number of loans together and non-bank investors buy shares in the funds. By the use of pooling and diversification, this is economically similar to securitisation, although there are some differences especially around liquidity and transferability.[103] According to the EIF's working paper on debt funds (2014), the launch of loan funds accelerated from mid-2012 onwards in Europe and in the US. Initially, fund managers were part of a hedge fund or a private equity fund, but later on branched out into specialized credit funds – this expansion mostly happened through private equity funds leveraging on their expertise of identifying target companies for acquisition purposes, and then extending such expertise to debt financing. Often times found investors in loan funds were generally non-banks that cannot develop an in-house credit selection and assessment capacity and/or want to diversify exposures.[104]

The Infrastructure Debt Fund ("IDF") is an illustrative example. The IDF was introduced by the Government of India in 2012 to mobilize financing for long term infrastructure projects from capital markets investors. The main goal of the IDF was to create a mechanism by which the institutional investors could be offered high quality fixed income assets that would be consistent with their investment guidelines in terms of credit quality, tenor and pricing and which would relieve them of the task of evaluating individual projects on a case by case basis. It serves in addition as a mechanism for commercial banks to address their asset liability mismatches by buying long term infrastructure loans and creating more headroom in their books for new project exposures. Moreover, it offers a mechanism that services this asset portfolio on behalf of the institutional investors and handle the project portfolio management complexities at the level of the IDF itself.[105] The IDF is co-sponsored by Industrial Credit and Investment Corporation of India, Bank of Baroda, and Citibank.

Some research has been done on the performance of ESG/SRI fixed income funds and fund managers. Among the insights picked up by the WB report, the following are some relevant:[107]

- Henke (2016) detected that socially responsible bond funds outperformed by half a percent annually during the period 2001–2014. The exclusion of corporate bond issuers with poor corporate social responsibility activities explained this in great part.

- Leite and Cortez (2016) detected cyclical patterns: European SRI funds provide some protection in market downturns, but otherwise the verdict is mixed.

- Hoepner and Nilsson (2017) investigated the ESG engagement activities of fixed income managers. Funds from fund management companies not involved in ESG engagement activities perform significantly worse indicating the materiality of ESG expertise and ESG engagement in fixed income investments.

Underwriting of sustainable debt directly by long-term financial sector investors. Certain institutional investors, including large insurance companies, have hired or trained professionals who understand the risks associated with underwriting sustainable debt. For example, the UK insurance and pension provider Prudential Insurance PLC has embarked in this process in different firms of the Group. It has developed internal capacity to underwrite sustainable infrastructure through it investment arm, M&G Investments, via an internal fund. M&G manages over £45bn[109] of debt across the infrastructure asset class, in both public and private markets. They have built a substantial portfolio over a number of decades and have a proven track record of originating, closing, and actively monitoring infrastructure investments. This has been also the case of Eastspring Investments, the Asian Asset Management business of Prudential PLC, signatory of the UN PRI. It is one of Asia's largest retail and institutional asset managers, with a total of US$182 billion (as at 30 June 2018) across equity, fixed income, multi asset, quantitative and alternative strategies on behalf of investors globally. Eastspring has recently strengthened its capability in direct underwritings, mainly driven by institutional investors increasingly seeing certain countries and sectors in Asia as being able to provide accretive risk adjusted returns in infrastructure. Moreover, increasing liquidity and low discount rates in developed economies have reinforced this trend. Eastspring's infrastructure team focuses in many highly prevalent global themes which have a particular bearing in Asia, such as climate change, demographic changes, digitalisation and data, information security and storage, energy security and ageing populations. Their business maps each of these themes to the specific target market and combines a top down and bottom up approach. Based on their experience, Eastspring finds that key challenges in developing such capacity and those underwritings are identifying the entry point which optimises return per unit risk, providing alpha relative to other markets and ensuring the investment team has global and successful track record and is able to bring to bear the highest investment standard.

Direct issuance and retention (or sale) of sustainable credit by a non-financial sustainable company. An example of this could be the origination of a loan or a lease for an electric

moped by the company that manufactured it. One innovative example illustrating the possibilities in innovation is the case of BBOXX DEARs**,** the SPV of the solar energy company BBOXX, where where future receivables from Kenyan purchasers of solar energy were bundled and a US$500 million bond was issued and sold to Oikocredit. Box 4 provides details of this case.

BOX 6. CASE STUDY: BBOXX DEARs

BBOXX is a British-based solar energy provider, that planned to lead the first-ever securitization of off-grid assets, by lowering its cost of capital as it scales in developing countries. Its ground-breaking financing structure has brought off-grid solar into the world's financial markets. The company designs, manufactures, finances and distributes innovative solar home systems to communities in developing countries. The majority of customers pay for the equipment via a three year hire purchase agreement, paid monthly via a mobile payment scheme. [110]

Oikocredit (1968) is a Dutch firm that currently act as a worldwide cooperative and social investor, guided by the principle of empowering people. It provides funding to the microfinance sector, fair trade organizations, cooperatives and small to medium enterprises. Its social performance and impact assessment tools focus on selecting the right partners and holding them accountable, monitoring social performance indicators, providing capacity building and gathering feedback to develop products and services. [111]

At the end of 2015, Oikocredit and BBOXX had teamed up to fund the distribution and financing of solar technology for low-income households in Kenya.

Sustainable Finance Product

BBoXX Distributed Energy Asset Receivables (DEARs) in 2015 was the first deal that used securitisation as a means of financing solar home systems in Africa. The securitization structure involves the bundling of contracts of BBOXX with customers that bought solar home systems to be paid off in instalments through an SPV (i.e., the company BBOXX DEARs), that in turn issues notes and sells them to Oikocredit. The future receivables on these contracts provide for the value of the notes; where the average net present value of each contract is US$300. BBOXX collects US$210 per contract bundled and transferred to the SPV, thus, if the cost per system installed is less than US$210, BBOXX would be recovering the cost right away and generating profit.

The securitization deal by BBOXX landed US$ 1 million.[112] It is worth noting that the data power of digital technologies allows to overcome several barriers and help devise innovative financial structures such as this one.[113] Through the use of smart credit analytics leveraging the data generation power of pay-as-you-go technologies, the repaying capacity and commitment of customers can be predicted, thus proving the genereation of returns investors seek. Foer the structuring of these asset-backed notes, BBOXX has leveraged the accumulated data for over 4 years.

The DEARs pool of securitized assets consists of 2,400 customers with a low likelihood of default, based primarily on repayment history. Going forward, BBOXX will apply more sophisticated data analysis to de-risk these small pools of assets.[114]

Challenges & Solutions

In launching the structuring to market, BBOXX found that the structuring of the note and creating the necessary legal instruments, including a Service Level Agreement (SLA) between BBOXX Kenya and DEARS, was more challenging than convincing investors of the commercial opportunity.

One critical critical decision that had to be made and was unexpected was deciding wether to securitise the customer contract or the revenue generating potential of the underlying asset. For investor visibility and speed to market, the former was the chosen.

Key Outcomes & Impacts

Through the structuring of this securitisation BBOXX was able to generate income out of its sales model with instalment payments up to three years earlier as well as to scale the production of the solar home systems.[115]

Since 2010, BBOXX has sold more than 150,000 solar kits and impacted over 750,000 lives across 35 countries, by providing more secure energy supplies which don't require an electrical grid infrastructure.

The potential for growth in the African continent is vast. The International Energy Agency (IEA) estimates that more than 1.2 billion people worldwide live without access to grid-connected energy, most of whom live in rural areas of Africa and Asia. Off-grid solar is widely viewed as the most effective and affordable leapfrog development model, but financing such expansion has often proven tricky.[116]

Almost 4 GWhrs of energy were generated, saving an estimated US$ 2.4 million by customers on energy expenses -something critical when considering that access to energy often pertains low-income populations, where basic needs represent a fairly large portion of their expenses. Also from a social impact perspective, over 63,000 school aged children can in turn study without stressing their sight and/or having to inhale harmful fumes from other less clean sources of off-grid energy generation. Over 40,000 tonnes of CO^2 were offset.[117]

Lessons learned

Demonstrating how securitisation can be effective in financing home solar systems is a big step in helping scale investments by different lenders and start reaching the more than 1.2 billion people worldwide without access to grid-connected energy.[118] BBOXX saw the benefit of using a conventional structure to an unconventional asset class. The ABS notes were a well understood instrument in the global economy.

In attracting long term investors, BBOXX understands that potentially having the credit note rated by Global Credit Rating Agency would be a major step, since an investment grade rating would pave the way for an eventual public listing.

Although Oikocredit is a small cooperative finance company and the assets are moving from a corporate balance sheet to a financial institution, the pathway (private sale) and product (securitisation) could be replicated to go in the other direction in other emerging markets.

Private digital platforms for the origination and distribution of sustainable loans. Smaller sustainable companies and enterprises (SSMEs) and large ones alike may choose to originate and distribute their sustainable loans directly to long-term investors on a digital platform. While still emerging, the applications of digital technologies to sustainable finance are growing, as the mapping by the Sustainable Digital Finance Alliance for the SFSG in 2018 has shown. Cases such as Convergence Finance, CleanTek Market, Neighborly, among others, provide leads into the possibility of originating and distributing sustainable loans via digital platforms. One interesting case to look at is the recently launched platform by Vontobel. Vontobel has set forth an online platform that also allows for the securitization of tailor-made financing solutions. The development of their platform responds to seeing that the public sector is increasingly opting for shorter-term and lower-cost financing options from institutional investors who are seeking alternative investment opportunities due to the prevailing low interest rate environment.[119] As this generates a greater reliance on the private placement segment, online platforms appear as a good fit, since they enable the interests of professional investors and borrowers to be aligned rapidly, transparently and cost-effectively. It can help institutional investors gain access to sustainable public projects from cities and municipalities not present in the capital markets. The public sector and medium-sized companies could broaden their investor-base and find capital which interests are aligned.

All of the private pathways described above require capacity-building in sustainability risks and rewards so that the sales people, originators and holders of the long-term sustainable debt are able to assess the sustainability risks of the loan at the point of acquisition or origination, and manage the asset within their portfolio thereafter.

Most importantly, each of these alternatives faces sustainability-specific barriers and opportunities that will be discussed in the proceeding chapters. Hence, it is likely they will play an increasingly larger role in these markets as the need for sustainable debt escalates.

4 BARRIERS TO DEVELOPING AND OPTIMIZING SUSTAINABLE FINANCIAL PATHWAYS, PRODUCTS AND INNOVATION:

There are specific barriers to opening pathways and products to sustainable finance, especially in the emerging markets.[122] The barriers to growing sustainable finance in this manner follow below.

1. **Awareness:** Lack or insufficient awareness for the need to increased levels of sustainable finance prevents generating the institutional contexts and empowerment that will trigger an acceleration of possible actions in general, and in capacity building in particular. Even in highly advanced financial centers such as London, New York and Shanghai, the awareness for the need to increase sustainable finance is limited. Conferences and financial news tend to self-select stakeholders who have knowledge of the need for sustainable finance. Further, awareness of the specific risk variables associated with non-sustainable investments is limited.

2. **Capacity-building**: Banks, institutional investors and other key stakeholders in the financial markets lack the knowledge, skills and empowerment to identify and evaluate eligible projects and to adequately structure, sell and manage these sustainable financial products. Promoting awareness of sustainable investments is essential, however, stakeholders need to be trained to evaluate these investments. The GFSG focused on data and the use of this data in the risk analysis function of sustainable finance. There is currently a shortage in human capacity able to deliver sustainable financial products and pathways in key markets that are able to accelerate change. Trained professionals who understand and can analyze environmental, social and governance risks tied to financial products are needed.[123] Capacity is needed in both developed and emerging markets.

3. **Sustainability classifications and taxonomies**: The absence of commonly agreed classification and taxonomies in sustainable finance retards action, even once awareness and capacity are provided. On the one hand, the lack of definition of assets that can be financed by a sustainable debt issuance obstructs their identification; on the other hand, it creates the risk of 'greenwashing'. The creation of taxonomies and standards offer benefits to the market as a whole by defining the assets that can be financed by a sustainable debt issuance. Corporates have a basis by which to measure the sustainable activity within their businesses. Investors benefit from the identification of the relevant assets and the mitigation of 'greenwashing'. It also creates a reference for effective public policy to develop clear objectives.

4. **Standards and labels:** A certified label signals compliance with standards and procedures that align with stated sustainability criteria and taxonomies. The lack of or under-developed certified labels hinders the identification of sustainable loans to be market refinanced or securitised. This in turn, challenges the ease with which investors can compare different investment products and make informed choices.

5. **Impact reporting:** The uneven development/implementation/disclosure of sustainability metrics for impact reporting hinders the availability of transparent and relevant information generating ambiguity for issuers and investors. Sustainability metrics for impact reporting, both quantitative and qualitative, can vary across sectors, locations and other contexts, and may also be harder to summarize in a single indicator. But while material information related to sustainability might be difficult to express in monetary terms, it is nevertheless of essential financial relevance. Their broader development could could also help enhance the integrity of the market.

5 OPPORTUNITIES AND FURTHER CONSIDERATIONS

Despite the potential benefits from optimized balance sheets and distribution income, many banks may be unwilling to sell large amounts of sustainable debt and leave their balance sheets exposed to mostly brown or less sustainable debt. Further, lack of willingness to sell can be the result of a desire to continue to hold attractive and profitable assets rather than originate new ones, especially if they are less remunerative, as well as for relationship reasons with sustainable finance clients.

To ensure that the whole array of economic, environmental and social benefits brought by sustainable finance are realised, the work towards addressing the aforementioned barriers must be diligent in assessing possible unintended consequences. The development of sustainable debt to long-term institutional investors using the pathways, products and structures outlined above must be vigilant to avoid negative unintended consequences. Further, capacity building must be essential to understand the sustainable attributes and risks to the financial products and make sure they do not fall victim to greenwashing. An understanding of the robustness of sustainable debt assets in structured products must be well stressed to ensure the structures and assets are stable.

Several of the barriers identified in the previous section could benefit from the advance/maturity of technological tools targeted towards sustainable finance. Block chain, artificial intelligence, cloud computing and advanced algorithms, among others, could help barriers dealing with issues of data, classifications, organising standards. Many of these technologies, and their possible applications, are currently nascent though already happening. Further analysing them and exploring ways to scale them or accelerate their proof-of-concept will certainly help advance the deployment of institutional capital towards sustainable assets. As these technologies mature they can become contributing catalyst to scaling sustainable debt products being placed with institutional and certain retail investors. Also, they could significantly help in making sustainable financial pathways more accurate, secure and cheaper.

6 VOLUNTARY OPTIONS THAT CAN BE EMPLOYED TO OVERCOME THE BARRIERS

It is advantageous to develop options for existing products and financing techniques that can voluntarily be taken forward by G20 members to increase sustainable capital market products. Such pathways or products can be either public or private and may include: debt capital markets (public), direct sale of sustainable assets (private) or technological platforms (public or private). This paper will consider the following options:

It is advantageous to develop options for existing products and financing techniques that can voluntarily be taken forward by G20 members to increase sustainable capital market products and alternatives thereof. Such pathways or products can be either public or private and may include: debt capital markets (public), direct sale of sustainable assets (private) or technological platforms (public or private). Based on the cases analysed, best practices, and consultation with players from the private sector, the following options came up as alternatives that G20 members could consider to address the barriers identified above:

1. **Build Awareness.** Government and key policy makers as well as financial trade organisations and leaders within the leading financial and investment companies in the financial markets should actively build awareness of the need for sustainable finance and the products and pathways advanced herein to drive sustainable development and jobs.
2. **Build capacity for the analysis of sustainable investments.** Development of the skills and training necessary to identify and evaluate the risks and opportunities of sustainable finance can be done by universities as well as trade organisations educational divisions. Curriculums should be developed to teach underwriters and investors alike of how to collect sustainable data and conduct sustainable risk analysis.
3. **Encourage convergence of sustainable taxonomies.** The B20, financial trade organisations, sustainable think tanks, or universities could individually or collectively convene a global group to move sustainable taxonomies and standards closer. The support of organisations such as the G20, UNEP, OECD among others could add weight and credibility to the work.
4. **Identify and understand unintended consequences.** Through capacity building and the identification of good data and robust risk analysis make sure the benefits and risks of sustainable finance is understood within the context of each market and country. This work should be done by country specific organisations that understand domestic economies (central bank, ministry of finance, think tanks, NGOs) as well as international IO's such as the FSB, OECD and the IMF.
5. **Raise awareness and understanding of risks and risk adjusted returns to promote/facilitate the issuance of green bonds, covered bonds and sustainable asset supported bonds.** The variations of green bonds described in the Synthesis Report are powerful, as they cover traditional financial structures not often used to drive sustainable investments. Many of these bonds require the

aggregation of loans and that these loans are transparently tagged as sustainable. However, only a handful of major banks have done so/do so. Further, covered bonds that retain an issuing bank guarantee is an increasingly popular hybrid for emerging market issuing banks to access funding from institutional investors in domestic as well as international markets.

6. **Promote the development of Institutional Investors' internal capacity to underwrite sustainable loans on their own.** In this case, as demonstrated by certain institutional investors in-house capacity was built to originate, monitor and service a portfolio of sustainable debt products. The increasing demand alone is driving institutional investors to underwrite sustainable loans on their own. That said, groups like the Loan Market Association and other global trade bodies who have recently developed a Green Loan Principals can provide clear guidelines to develop sustainable loans.
7. **Asset managers building capacity to manage portfolios sustainable loan assets for long term investors.** Like Institutional investors, asset managers can move into the sustainable loan market for smaller institutional investors who are not able to build the capacity sufficient to manage or originate sustainable loans on their own. Institutional investors eager to obtain exposure to sustainable investments can drive this opportunity.
8. **Development of asset managers who oversee sustainable collateralised loan obligations ("CLOs").** CLOs have been a powerful means to move loans from bank balance sheets into the DCM via the issuance of liabilities (green bonds) to gain the funds to purchase the sustainable loans. The asset managers oversee the loan portfolio like a bank would and by taking the loans into their SPV the banks are able to gain balance sheet capacity via a true sale. Bond trade organisations, rating agencies, informed banks and financial service law firms could drive the development of this opportunity.
9. **Development of virtual tech platforms that bring together sustainable assets and investors.** This type of leap-frogging technology could allow emerging market banks to churn their balance sheet to sustainable investors and therefore allow for additional balance sheet capacity to underwrite new sustainable loans. Many young and innovative firms, driven by entrepreneurs could grow this opportunity. Further, local and federal governments could provide the environment and incentives for these companies to grow and succeed.

7 CONCLUSIONS

Aggregated bonds of all forms discussed in this paper offer institutional investors who buy in the large and liquid bond markets of the world an opportunity to access the cash flows of sustainable assets across all sectors. Further, this pathway allows banks the opportunity to free up capital to go out and finance new sustainable investments that make up the US$ 100 trillion challenge facing the world between now and 2035. Bonds can help in increasing the speed at which capital can be "recycled" back into development, construction and early-stage risks, and also helps to attract additional early-stage finance. Investors are more likely to invest their capital in construction phases if there is a credible and predictable low-cost exit once assets become operational.[124]

Although the amount of sustainable finance needed in the medium term to finance the path to a sustainable economy is staggering, the funds available from long-term institutional investors are sizable and most likely enough to meet the challenge of achieving the SDGs.[125] Hence, it is important for the pathways described in this paper be effective across all countries and asset classes. Financial products or alternative debt originators could be designed to deliver sustainable debt following established market practices such as the Green, Social or Sustainable Bond Principles in countries that do not have developed capital markets. This would facilitate the crowding in of sustainable long-term institutional investors over time. It is through the increased underwriting velocity of green tagged loans into the hands of institutional investors either through public or private pathways explored in this paper that the world be able to finance the transition to a sustainable economy at the pace and scale required.

Endnotes

[1] Long term institutional investors are defined as ones that have long term liabilities such as insurance companies, pension funds and sovereign wealth funds that desire long term assets to match said liabilities. However, other long term investors exist via aggregated long term funds invested in my individuals looking for long term growth.

[4] To finance large volumes of assets long term and at pace and scale requires investors who can hold the debt a long time OR that these investors originate the debt themselves. For example, there are insurance companies that finance long term sustainable infrastructure on their own rather than buying the debt from banks. Further, other institutional investors obtain exposure to long term sustainable assets by investing in asset managers who have pools of sustainable debt they may have originated themselves or purchased from banks.

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[11] Although large hydro-electric power generation is a form of sustainable energy and has attracted significant institutional investment, it is outside the scope of this research, as this research relies primarily on the BNEF database (BNEF, 2017) for investment transactions and its associated definition of "clean energy" which excludes large hydro. BNEF excludes large hydro arguing that this technology has been mature for decades and is at a very different stage of its roll-out than, for instance, Solar PV.

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